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DESCRIPTORS- *LIBRARY EDUCATION, *LIBRARY REFERENCE SERVICES, *PERFORMANCE FACTORS, *EVALUATION, *LIBRARIANS, GRADUATE STUDY, HYPOTHESIS TESTING, COMPARATIVE ANALYSIS, FIELD STUDIES, PROFESSIONAL TRAINING,

IN ORDER TO EXAMINE THE RELATIONSHIP BETWEEN FORMAL LIBRARY EDUCATION AND EFFECTIVENESS IN ANSWERING REFERENCE QUESTIONS, FIELD STUDIES WERE CONDUCTED IN WHICH 9 PAIRS OF REFERENCE STAFF MEMBERS IN MEDIUM-SIZED PUBLIC LIBRARIES WERE ASKED A SET OF TEST REFERENCE QUESTIONS AND OBSERVED WHILE THEY ANSWERED THEM. MAJOR CONCLUSIONS WERE THAT--(1) THE STUDY HYPOTHESIS, WHICH PREDICTS THAT PROFESSIONALLY TRAINED LIBRARIANS WILL BE ABLE TO ANSWER A LARGER PROPORTION OF INFORMATION REQUESTS AND IN LESS TIME THAN UNTRAINED LIBRARIANS, IS SUPPORTED BY THE STUDY DATA, (2) BOTH TRAINED AND UNTRAINED LIBRARIANS TENDED TO ACCEPT THE FIRST ANSWER FOUND, (3) THE SIGNIFICANT DIFFERENCES WERE ON THE VARIABLE OF ANSWERING SPEED, ALTHOUGH THEY WERE NOT GREAT, (4) TO A LIMITED EXTEND, THE FINDINGS SUPPORT THE PRINCIPLE THAT REFERENCE WORK SHOULD BE PERFORMED ONLY BY TRAINED LIBRARIANS, (5) FINDINGS ALSO SHOW THAT LIBRARIANS WITHOUT TRAINING CAN ANSWER ACCURATELY AND QUICKLY A WIDE RANGE OF FACTUAL REFERENCE QUESTIONS, (6) OTHER DUTIES THAT ALLOWED INCREASED FAMILIARITY WITH THE INFORMATION CONTENTS OF THE LIBRARY COLLECTIONS WERE VARIABLES THAT AFFECTED REFERENCE EFFICIENCY, AND (7) THE KNOWLEDGE ON WHICH INCREASED EFFICIENCY IN ANSWERING QUESTIONS WAS BASED IN FAMILIARITY WITH THE LIBRARY COLLECTION. PRACTICAL IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH CONCLUDE THE REPORT, AND A 32 ITEM BIBLIOGRAPHY, DATA TABLES, THE TEST QUESTIONS, AND OBSERVATION SCHEDULES ARE APPENDED. THIS REPORT IS AN ABRIDGEMENT OF A UNIVERSITY OF ILLINOIS PH.D. DISSERTATION WITH THE SAME TITLE. (JB)

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PROFESSIONAL EDUCATION

AND

REFERENCE EFFICIENCY

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PROFESSIONAL EDUCATION AND REFERENCE EFFICIENCY

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This report is an abridgement of a Ph.D. dissertation with the same title submitted to the Graduate College, University of Illinois, 1967.

Paul Powell
Secretary of State
and State Librarian

Illinois State Library
Springfield, Illinois
September, 1967

PREFACE

The research reported here was done through the facilities of the Library Research Center, University of Illinois, with the support of funds from the Illinois State Library. This report is an abridgement of a Ph.D. dissertation with the same title completed at the University of Illinois. The full text of the dissertation contains considerably more detail than the present report, particularly regarding research and analysis procedures and numerical data, and is available from University Microfilms.

The completion of a study such as this is dependent on the cooperation of a great many people. Sincere thanks go to the librarians who responded to the reference staff survey questionnaire, to those who took the trouble to send reference questions, and to those who completed and returned the question-rating forms. The assistance of the administrators and staff members who cooperated in the pre-tests of the research instruments and procedures at the public libraries of Champaign, Glenview, Urbana, and Winnetka, Illinois, is also much appreciated.

A great deal of credit is due the reference staff members who participated directly in the study. Each one rendered service quite beyond the call of duty by graciously submitting to several hours of fatiguing reference work under the close scrutiny of the investigator. Likewise, gratitude is expressed to the administrators of the participating libraries, who gave willingly of their time and information, as well as extending many professional and personal courtesies to the writer.

Two members of the Library Research Center staff are particularly deserving of thanks for their excellent clerical assistance, namely Mrs. Sharon Pollock and Mrs. La Verne Caroline. The writer is also grateful to the members of his doctoral committee, Dr. James Carey, Dr. Dewey Carroll, Dr. Herbert Goldhor, and Dr. Rolland Stevens.

Finally and most important, heartfelt thanks are extended to Dr. Guy Garrison. As Director of the Library Research Center and major advisor on the doctoral committee, he gave unstintingly of his time, advice, and encouragement, from the formulation of the research proposal, through the difficult weeks of data collection, to the reading of the final manuscript. Without his help the study could certainly not have been done; if it proves worth the effort, considerable of the credit will be his.

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CHAPTER I

THE PROBLEM AND RESEARCH METHOD

One of the most serious factors hampering the library profession in its attempt to deal with the present crisis in library personnel is a lack of objective knowledge--and thus of substantial agreement--about the qualifications and characteristics necessary for effective service in various library positions. On the one hand, library educators find it difficult to arrive at judgments as to what should be taught prospective librarians when so little is known about the true characteristics of the market for their product, especially in terms of the real differences between the tasks the professionally educated librarians will be asked to perform and those tasks assigned to staff lacking such education. On the other hand, library administrators, who are charged by the educators with mitigating this condition by careful study of job requirements and more enlightened assignments of talent, feel greatly hampered by a lack of objective evidence of a real relationship between library education and effective performance at specific job levels. This leaves the way open for some administrators to assert that not enough differences in capabilities between trained and untrained people exist to make the differential assignments to staff called for by the educators and to lay the fault for this situation on misjudgments by library educators.[1]

The reference staffing aspect of this more general problem is particularly challenging. For one thing, there is a fair-sized body of speculative and pragmatic literature, based on the experience of reference librarians and administrators, concerning the qualifications needed for reference work. And yet, this literature raises serious problems. One group of writers, noting that it is in reference work that the library staff comes into most crucial direct contact with the patron, emphasizes native qualities and personality traits, with practically every possible desirable human trait having at one time or another been put forward as necessary to effective reference work.[2] On the other hand, there is an equally strong theme in the literature to the effect that extensive scholarly and education attainments are of utmost importance to reference work.[3] Since all these qualities are surely not to be found in any but a very few persons, the literature raises the problem of relative importance between native qualities, presently very hard to identify and measure, and educational attainments, as yet not specified in much useful detail.

Reference service is all the more interesting in that it provides an assumption or normative principle as a point at which objective research might begin. Since one of the main tasks of library reference work is that of answering reference questions asked by patrons, it might be expected that differences on the variable of the reference question, particularly the dimension of difficulty, would be used in making decisions concerning differential staff qualifications and assignments. However, as yet the practitioners and administrators have for many practical and theoretical reasons had very little success in producing even widely agreed upon and useful definitions for reference questions, much less in characterizing and measuring differences in difficulty among them.[4] This, plus the fact that questions of varying difficulty come to the reference desk with no predictability, making staff assignment on the basis of question difficulty all the more hard, has over the years helped to produce the assumption or norm that all reference work involving answering patrons' questions (except perhaps the most obviously simple "directional" questions) requires the qualifications of a professionally trained librarian.[5]

The general problem set for this study was to gain some empirical data which might bear on the factual basis for this assumption or norm. More specifically, the study was aimed at exploring the relationship between formal library training and effectiveness in answering reference questions.

Related Literature

There is a considerable body of literature reporting studies on the relationship between formal education and occupational success in various fields, including a few in librarianship. McCrossan has surveyed the major studies among these.[6] He found that the better studies showed small or moderate relationships between education and job success and concluded that further research should show a similar relationship between library school education and competence in specific areas of library practice.[7]

In the specific area of reference work the few studies touching on personnel are part of a relatively small body of research literature on reference service in general. The existence of several reviews and surveys of this literature makes repetition here unnecessary. Perhaps the best such review article is that by Rothstein,[8] who in turn cites Shores[9] and the chapter by Wheeler and Goldhor[10] as among the most comprehensive and discriminating summaries.

While most of the studies dealing with educational requirements for reference personnel have started with the very assumption that is under investigation in the present study, a few have attempted to provide information dealing with the value or necessity of formal library education for reference work. Breed attempted to ascertain the extent to which certain kinds of knowledge were called upon by reference librarians in the search process used for answering questions.[11] He found that 81 percent of the decisions or process steps taken by the librarians studied relied on library specialization knowledge.[12] However, since he included in the library specialization category knowledge derived from library work experience as well as that gained from formal training, little information is provided by the study on the question of the value of formal education.

In a study at the John Crerar Library, Jacobs concluded that around one-half of the questions received by the Science and Technology Department could have been answered by personnel lacking formal library training.[13] However, rather than actually measuring the ability of untrained persons to answer the questions received by the department, Jacobs used a priori definitions of the kinds of questions among all those received that would be appropriate to untrained staff. Most of the kinds of questions included among those considered answerable by untrained personnel pertained to lending materials, orders for photoduplications, and simple directional questions. Since these question types are usually excluded from those called reference questions in most libraries, little data on the central problem of the present study was provided.

Finally, Guerrier studied the reference questions asked in nine large city public library systems during one week in 1935.[14] Although the main purpose of her study was to provide information on the measurement and tabulation of reference work, her conclusions did touch on reference staffing. After designing a four-category classification and grouping the questions studied, Guerrier concluded:

> The analysis of questions submitted by libraries in different sections of the United States emphasizes the fact that the major part of what is termed "reference work" is of the fact-finding or information type. In answering such questions the services of a specialist are not required. It should be possible for a general assistant with library school or college education who thinks and acts quickly and who is endowed with common sense, a retentive memory and fact-collecting instincts to become in a short time qualified to answer without fumbling 83% of the questions submitted. . . .[15]
> (Italics added)

Guerrier's study provided data only on the frequency of the types of questions, not on the ability of general assistants with college education to answer them; the latter seemingly came from the investigator's extensive library experience.

The Hypothesis

In an attempt to specify more explicitly the relationship between formal library education and reference performance, as a step in formalizing the assumption or norm mentioned above into a hypothesis to guide the present study, other parts of the literature of reference work, particularly those dealing with reference education and reference administration, were examined. By noting what library school teachers generally consider important for a student to learn, relative to reference work, and what reference administrators expect the reference librarian to bring from library school, the assumed relationship between education and performance might be more precisely defined.

Central to reference instruction has always been an emphasis on the student's gaining control over as much information as possible, in order that he might bring this information to bear on the needs of his patrons. In earlier times it was thought that this could best be achieved merely by using training and experience to give the reference librarian direct and detailed acquaintance with as many information sources, or "reference" materials as possible. In the last few decades the feeling has developed that gaining control over or access to the information needed to answer the reference questions of library patrons requires a somewhat different kind of knowledge and training.

In this newer concept of reference education what is consistently emphasized is that the aspiring reference librarian must bring to library school a broad general education; he must learn the existence and characteristics of a number of reference tools, particularly those serving as keys to the information content of the rest of the collection; and he must use these two, in combination with concepts and information from other library school courses, such as cataloging, to acquire skill in certain techniques for answering reference questions. This reference skill, which is to be the product of the reference librarian's education, has been characterized as a reasoning process,[16] as a process of classification or categorization,[17] or as a decision-making process describable in the language of decision theory or information science.[18] Generally speaking, this process consists of: 1) making sure the question, as understood by the librarian, coincides with the actual information needs of the patron; 2) analyzing, categorizing, or classifying the question on a number of dimensions in order to formulate a search strategy; 3) translating the terms of the question into the language of the relevant parts of the reference system (catalog subject headings, bibliography entries, index terms, etc.); 4) making various decisions involved in conducting the search itself; and 5) evaluating the information found, in terms of the patron and his needs.

The authors of the literature on reference work do not imply any direct one-to-one relationship between library school training and success as a reference librarian, particularly over time after the librarian's graduation. Rather, the implication seems to be that the background brought to library school; the tools, skills, and general approaches learned there; and the subsequent structuring of reference experience will combine to produce the skillful use of a general reference approach that enables the trained librarian effectively to bring under his control the relevant portions of a large body of information to answer the question at hand.

Though it is never explicitly stated, the correlative implication seems to be that the skill of reference librarians without professional training will be based on learning by experience that certain documents from a given collection provide answers to certain questions or types of questions recurrently asked by the patrons of the library in which the staff member works. Due to a lack of training in the reference reasoning process, the untrained reference staff member supposedly will not structure his experience in such a way as to increase skill in a step-by-step decision process whereby effective access can be gained to a significant portion of a collection of informational documents assumed to be far too large to attempt direct acquaintance with but a small portion. Rather than developing a pattern of thought wherein, as Hutchins puts it, several steps are taken "before a hand is lifted toward a book" (at least a book expected to contain the actual information sought), the untrained reference librarian is expected typically to turn very early in his reference process to a document he hopes will contain the needed information, and inefficiently to continue to turn to other documents until the needed information is produced or the range of possibilities under his control is exhausted.

In brief, then, reference administrators and teachers have asserted that all reference questions should be answered by librarians with formal library education. This assertion rests on the expectation that library education and required pre-professional education will equip the librarian with knowledge and skill necessary to producing the answers to patrons' questions. Formalizing this assertion and expectation somewhat, the following general hypothesis was derived:

> Other things being equal, the professionally trained reference librarian will be able to answer a larger proportion of information requests and will do so in less time than will the untrained staff member, because the trained librarian will have developed skill in a reference process that affords him effective access to the informational contents of a larger portion of the library's collection.

General Research Method

The general research situation that was chosen for this study was that of the field study, in which the hypothesis could be studied in at least a limited way, while allowing for the discovery and exploration of interrelationships among other important factors in reference staffing. Given the time limitation of the study, the only feasible way to manipulate the independent variable seemed to be to compare subjects having formal library education with subjects lacking such education. This determined the use of a research strategy often called the ex post facto experiment, wherein an attempt is made to trace a measured difference on the dependent variable back to a pre-existing difference on the independent variable, not directly manipulated by the investigator.

As mentioned above, not a great deal is known about the operation of variables relevant to the performance of reference personnel. However, experience and common sense do suggest some variables that should be controlled in such an experiment as this. Undoubtedly, the speed and accuracy with which a reference question can be answered are affected by such factors as size and composition of the book collection, physical arrangement of the library, and local procedures--factors which always vary from library to library. The most feasible way to minimize the effect of these interlibrary variations appeared to be to use a pair or pairs of staff members at each of several libraries. One member of each pair was to have a fifth-year library degree and the other little or no formal library training. Other factors possibly or probably relevant to reference performance are amount of undergraduate or non-library education and amount of experience in reference work. These were to be controlled by making sure that the members of each pair were approximately equal in these respects. Other possible variables present themselves, e.g., age, intelligence, personality, etc. While matching on these might well have increased the power of the test of the hypothesis, it was feared that attempting it should too severely reduce the number of available subjects.

The experience of the investigator and data from the ALA reference survey[19] indicated that medium-sized public libraries often employ both professionally trained and untrained staff to answer reference questions. This size and type of institution was therefore chosen for the study. To simplify scoring procedures, and because a large proportion of reference questions have been found to fall into this category,[20] only questions asking for verifiable factual information were to be studied. Thus, the general hypothesis was to be tested by attention to a considerably more specific proposition, i.e., that other things being equal, in a given medium-sized public library a reference librarian with a fifth-year library degree will be able to answer more reference questions asking for specific factual information, and to do so more quickly, than will a reference staff member with little or nor formal library school training, because the trained librarian will have developed skill in a reference process or technique that affords him effective access to a larger amount of the information contained in the library's collection.

Selection of Cases

Before cases could be selected for study, it was necessary to identify potential pairs of reference staff members. This was accomplished by sending in June of 1966 a survey questionnaire concerning reference staff to all medium-sized public libraries in Illinois, Indiana, Iowa, Missouri, and the southern tier of counties of Wisconsin. Since the purpose of this survey was merely the identification of potential cases and not the gathering of detailed information on reference staffing, the results will not be presented here. Some data from the survey, as well as more detailed information on the definitions and method used, have been reported elsewhere.[21]

The survey population (excluding two libraries which were queried but which were judged later to fall outside the defining limits) included 69 libraries serving populations of 13,368 to 184,714; having 51,418 to 341,000 volumes; spending $31,200 to $287900 on salaries; and open 58 to 77 hours per week. The medians for the surveyed libraries were 51,393 population served, 93,313 volumes held, $77,500 salary expenditure, and 69 hours open. Sixty-one, or 88 percent, of the libraries returned completed questionnaires. The respondents were spread across the entire survey population ranges on the defining factors. The medians for the responding libraries were 51,397 population served, 89,059 volumes held, $78,300 salary expenditures, and 69 hours open per week.[22]

The questionnaire asked the libraries to indicate the total number of reference staff members who gave reference or information service to adults for as many as eight hours per week from the central or main reference department or collection. Of this total they were then asked to indicate the number of staff members holding fifth-year library degrees, the number with undergraduate library science majors, the number with two years or more of college and three or more courses in library science, and the number with two or more years of college but less than three courses in library science. For each person indicated in the four education categories they were asked to give the number of years of reference experience.

Originally it had been thought possible to construct pairs with various combinations of the four education categories mentioned on the questionnaire, while holding library and experience constant for each pair. Analysis of the questionnaire returns showed that it was advisable to use only the "fifth-year degree" and the "less than three library science courses" categories. The plan for the study included some attention to differential performance by staff members with different amounts of reference experience. Thus, pairs of staff members used in the present study were to have varying amounts of reference experience.

On the basis of the survey, 21 libraries were chosen as having staff characteristics potentially appropriate for study. Telephone conversations and correspondence with the head librarians of these institutions reduced the number to twelve. Four of these twelve were chosen to pretest the various procedures and instruments for the study, and eight were chosen for the actual data-gathering field visits. Data from one library was ultimately not usable because one staff member was ill at the time of the visit, leaving seven libraries with nine pairs of staff members.

Table 1 shows the characteristics of the libraries studied, and Table 2 shows the characteristics of the participants. In the library where there were three pairs, the investigator decided that one pair set up on the basis of information from the administrator did not meet the requirements of the study. However, since the untrained member of the pair (F2 from Table 2) was fairly well matched with the trained member (E1) of another pair, it was decided to use the data from this latter librarian again, thus creating the pair F1 (E1 repeated), F2. In all computations and tables presented throughout this report the scores for the trained members of pairs E and F represent the scores of the one trained librarian repeated. It was not possible to match each pair precisely on the amount of undergraduate and non-library-science education. The amounts held are shown in Table 2, and the possible effects of the differences are considered in the sections dealing with findings.

TABLE 1

LIBRARIES IN WHICH PARTICIPANTS WORKED

Library	Population	Volumes	Salary Expenditure	Participants
1	108,458	159,504	$181,000	A1, A2
2	63,715	131,554	93,700	B1, B2
3	33,589	62,319	38,500	C1, C2
4	59,364	128,503	168,700	D1, D2
5	55,719	94,477	144,100	E1, E2 F1, F2 G1, G2
6	71,755	149,813	108,600	H1, H2
7	47,330	71,451	53,000	I1, I2
Median	59,364	128,503	$108,600	

TABLE 2

CHARACTERISTICS OF PARTICIPANTS

Participant	Reference Experience (Years)	Amount of Library Education	Other College Education (Years)	Age	Library
A1	1	Degree	4 1/4	46	1
A2	2	3 Courses	4	50	1
B1	2	Degree	4	24	2
B2	2 1/2	None	4	31	2
C1	3	Degree	4	25	3
C2	3	1 Course	1 1/2	32	3
D1	3 1/2	Degree	4 1/4	28	4
D2	4	None	4	40	4
E1	8	Degree	4	57	5
E2	7	None	2 1/2	49	5
F1	8	Degree	4	57	5
F2	5	None	4	52	5
G1	11	Degree	4 1/4	47	5
G2	9	None	4 1/4	51	5
H1	10	Degree	4	44	6
H2	12	None	4+	58	6
I1	19	Degree	4	50	7
I2	20	None	2+	60	7

Measurement of Reference Performance

There is no precedent in the research literature for procedures to measure the effectiveness of the reference performance of staff members. Ideally, perhaps the best way to compare the accuracy and speed with which staff members are able to answer questions would be to observe carefully their performance in answering actual questions asked by patrons in the library. Preliminary planning included this procedure as a possible approach. Reflection on past reference experience, as well as an early exploratory study in a public library reference department, pointed out the fact that in a reasonable amount of time one cannot expect two staff members to be asked a large enough number of questions with sufficient similarity to allow comparison of their performance.

Construction of the test.--The alternative that seemed to involve the least danger of bias was to construct a test set of questions composed of reference questions that had actually been asked in libraries similar to those studied. The investigator was to ask these questions of each staff member studied, under conditions as similar as possible to the natural reference situation, and to observe and record carefully his performance in answering the questions.

A letter requesting such questions was addressed to 24 head reference librarians in Ohio, Michigan, Wisconsin, and Minnesota. Notices asking for questions were also placed in professional journals.[23] These procedures yielded some 350 questions, from which those that asked for verifiable factual (not interpretative or judgmental) information were separated. In order to assess the possibility and approximate difficulty of answering these questions from a public library collection, the investigator attempted to answer each of them in a local medium-sized public library.

In an attempt to increase confidence in the investigator's judgment of the difficulty of the questions, the judgment of other reference librarians was sought. Forty questions were listed on each of two rating forms. The forms, along with letters asking librarians to rate the difficulty of the questions, were sent to each of 47 libraries in the original survey population which had responded to the questionnaire but which had not been chosen to be studied (see Appendix B). Thirty-seven sets of completed forms were returned. In general the judgments of the responding librarians supported those of the investigator, particularly on those questions finally chosen for the test.

When it came to actually constructing the set of questions, several rather arbitrary decisions had to be made. The study was planned with the expectation that at least three hours would be spent with each staff member asking the test reference questions. Allowing time for a coffee break and for the informal discussion of each question, and figuring on from a few seconds to several minutes answering time per question, it was anticipated that all persons studied should be able to complete just under 20 questions. Since it was desirable for each participant to be exposed to questions varying on a number of dimensions, it was decided to construct a group of from 15 to 20 questions containing as much variety as possible. In order to obtain additional data from those persons who would be able to complete a larger number of questions, another similar but shorter set was made up and used also.

The initial group of questions contained 17 items. There was a fairly even spread on the dimension of difficulty, as judged by the investigator and the rating librarians. Most subject fields, as categorized by the Dewey Decimal Classification system, were represented, with concentrations in the social sciences and the area of science and technology, in accordance with previous studies on reference questions.[24] Questions typical of those arising out of school work (a very significant component of adult reference work) and of those arising out of more practical situations were included. Finally, there were variations among questions with a high probability of being answered from strictly reference materials, those probably requiring circulating books, and those requiring periodical materials, again in keeping with previous studies.[25] The second group of questions in the total set contained 12 items, in general varying on the same dimensions. The arrangement or sequence of the questions within each group was determined by the desire to place less difficult questions throughout the test, to provide encouragement and satisfaction, and to avoid any self-instructional features in the progression of the test (see Appendix C).

Scoring.--The scoring procedure that was used on the test instrument was to categorize each response to an attempted question as either "answered correctly" or "not answered correctly." This is an admitted simplification of what happens in library reference work and what happened in response to the test questions. However, it was felt that a more precise or detailed scoring procedure would exceed the reliability and validity of the test instrument.

For scoring purposes all answers to a single question were considered together. For each question the best answer produced by any participant was used as a criterion for correctness. This "best" was selected for having been based on the most up-to-date and authoritative information. Then each answer judged similar enough to this best answer to be of about the same usefulness to a patron was scored as "answered correctly." Answers to the question under consideration that were untrue or contradictory to the correct answer and the failure to provide any answer to an attempted question were scored "not answered correctly," as were answers that were partially correct but judged more similar in usefulness to no answer than to the "best" answer. Each answer was also scored in terms of the time taken to produce it. The number of questions answered correctly and the time taken to produce the answers were combined in various ways, as will be indicated in the sections dealing with findings.

Validity.--Because of the dearth of previous research in the area, hence of objective criteria, and the exploratory nature of this study, little of a rigorous or statistically sophisticated nature could be done to establish the validity of the measuring instrument. Some steps were taken to insure or check some types of validity and thus to increase confidence in the general presumptive validity of the test. The paragraphs above outline a careful attempt (i.e., gathering the questions from actual departments similar to those studied, seeking independent judgements on their difficulty, varying the type of questions in accordance with experience and research) to insure that the test was representative of the universe being measured--a measure of content validity. Informal comments regarding the comparison of the set of questions to those typically asked of them were elicited from participants; these generally increased confidence in the validity of the test.

One outside criterion which the study attempted to use as a check on the predictive or concurrent validity of the test was the opinion of the supervisors as to the question-answering ability of the participants, as obtained in interviews. This attempt was only partially successful, since some administrators were hesitant to make a distinction. However, usable information from these interviews tended to support the validity of the test.

Finally, the investigator's judgment of the comparative reference performance of the staff members studied was used as a criterion to assess the validity of the test. This judgment was based on close observation for at least a three-hour period of each subject doing actual reference work with patrons. Although for a few participants the three hours yielded few questions for observation, the comparative judgments reached on the basis of the observations agreed with the differences on the test.

On the whole, the investigator felt that sufficient evidence was found to consider the test and scoring procedures adequately valid at least to rank the participants and to rank the differences among them, thus allowing statistical manipulations appropriate to this level of measurement.

Observation/interview guide.--It was hypothesized that differences in speed and accuracy between reference staff members could be related to a difference in their procedure or technique for answering questions. Thus, a major portion of the data gathering had to be the careful recording of the staff members' behavior while they attempted to answer the questions. Since little was known as to what specific kinds of behavior might turn out to be relevant to answering efficiency, it was desirable to make as complete a reocrd as possible of the participants' behavior and even thoughts if possible. After various means for mechanically recording the processes were considered and rejected, it was decided to construct an observation schedule on which to record overt behavior, accompanied by an interview guide to attempt to get at relevant thought processes (see Appendix D).

The observation schedule was designed so as to allow recording behavior by simply checking appropriate categories, while avoiding the necessity for forcing behavior into categories that were too restrictive. This latter was accomplished by being as detailed as possible in the categories and leaving space for notes on each behavior step. Previous studies and texts on reference work gave some indication of what types of behavior might be expected, though they tended to dwell on what should happen rather than on what actually does happen. Works by Alexander,[26] Barton,[27] and Hutchins[28] were particularly helpful. On the interview guide to be used after each test question was attempted some questions were left rather open-ended, to get at thought processes unanticipanted by the investigator; other questions were specific, to gather information on particular decisions felt to be relevant to reference technique.

Administration of the Test

The actual testing sessions began with the investigator's reading the same instructions to each particupant and answering any questions he might have (see Appendix E). Then each question was asked in turn, and the investigator followed the participant about as he attempted to find an answer. As soon as the question was stated once by the investigator, a stop-watch was started. As the particpant attempted to find the answer, each observable step was noted on the observation schedule and each relevant verbal comment recorded. As soon as an answer was pointed out, or failure admitted, the stop-watch was stopped and the time recorded. The search for an answer was not allowed to go beyond 15 minutes, unless it appeared that the next step would produce the answer. This was done to insure coverage of the entire first group of questions by each participant. After each question was attempted, the investigator asked the participant questions, under the guidance of the interview schedule, about the decisions and thoughts involved in the finding of the answer. The answers to these questions were recorded on a copy of the interview guide provided for each question. It was found more useful to deal with the information from this observation/interveiw guide somewhat directly, rather than via a formal scoring procedure. Thus, methods of abstracting and combining data from this guide will be discussed when the findings are discussed below.

Other Variables

As was mentioned above, the choice of the general research method used in this study was dictated in part by the desire to gain information on the operation of variables other than the major ones of the hypothesis. Thus, data on several other characteristics of the participants and the reference situation at each library were collected. This section will discuss procedures for collecting this data and for arriving at rankings for the different variables. Subsequent chapters will discuss findings resulting from these procedures. Two interview guides were constructed to aid in gathering this information. One guide was used to structure an interview with the supervisor of each pair of reference staff members studied. In most cases the person interviewed was the head of the reference department or the head of adult public services. In cases where the reference administrator was a subject for the study, the head librarian was interviewed. One of the main purposes of this interview was to get the impressions of the supervisors regarding the comparative ability of the participants to answer reference questions, as mentioned in the section on validation above. Questions regarding the library collection were also asked, as well as a question concerning in-service training programs for reference staff. Each supervisor was also asked about his library's policies and procedures regarding the referral of questions from one staff member to another, on the assumption that a staff member who had always been required to refer difficult questions to another librarian would be at a disadvantage in attempting the test questions. None of the libraries was found to have policies or procedures worked out formally enough to raise this danger. Finally, questions were asked regarding the library practices on obtaining outside help on questions, again on the assumption that this might make a difference in the staff members' performance. Again, not enough difference from library to library was found to matter, since all professed to use other sources to a moderate extent.

The second interview guide, used in an interview with each reference staff member studied, was designed in part to check on how well members of each pair were matched on the variables mentioned in earlier sections, such as amount of undergraduate and non-library education and amount of reference work experience. In addition, it was anticipated that the ages of the participants, the major subject of non-library education, in-service training and supervision, number and content of formal reference courses, non-reference work experience, and non-question-answering duties regularly performed might be variables worth attention. Accordingly, questions concerning these were included in the formal interviews.

In addition to the formal interviews, considerable information was gathered from informal unstructured conversations with participants and administrators and from observations and note-taking. One unanticipated variable on which attention was focused by these discussions was the relative amount of time a staff member actually spent at the desk answering questions during a typical week. This information was gathered for each participant and is related to performance later in this report. Likewise, some of the librarians considered the variable of time elapsed since the completion of formal education to be as important or more so than that of age, so that this is taken into consideration in the findings also. Finally, notes were taken on the procedures and physical layout of each library relevant to reference work.

In-service training and supervision.--Although they were treated as separate matters on the interview guides, as the study proceeded it became clear that in-service training, amount and kind of professional supervision, and self-education techniques, as well as the unanticipated variable of amount and type of contact with non-supervisory colleagues, could more usefully be considered together as constituting one variable or construct. It was also found that the only meaningful differences on these variables were among the participants lacking the fifth-year professional degree. Findings on the various components of the in-service training and supervision construct were considered and the untrained participants were ranked according to the relative amount of the construct as a whole each was judged to have had. For the two untrained participants who had some formal library science, this fact was also used in arriving at the rankings. Findings on this variable are discussed below on page 31.

Non-question-answering duties and other work experience.--Work experience other than library reference work was so varied and lacking in pattern that it did not constitute a meaningful variable to be related to performance. Non-question-answering duties regularly performed by the participants were handled in two parts. First, those duties connected with the selection and handling of reference books were separated out for each participant. These consisted mainly of responsibilities for helping select reference books for purchase and for processing or examining all or some of the reference books purchased. These duties were considered as a whole for each participant, relative amounts of difference in such duties were assessed for each pair, and the pairs were ranked according to the sizes of the differences. For example, in one pair neither member had any responsibility for helping select reference books and in another both members had considerable such responsibility; these were judged to have no difference on this factor and were ranked low. In other pairs the trained member had substantially more such involvement in book selection than did the untrained member, and these pairs were ranked high. The findings are discussed on pages 32 and 33. The second part of the information concerning duties other than answering questions dealt with a wide variety of duties, which lacked enough pattern to permit scoring or rankings. They are dealt with more directly in relation to reference procedure in Chapter III.

Differences among libraries.--It was anticipated that a large proportion of the differences in reference performance among participants, whether trained or untrained, would be due to various difference among the libraries in which the participants worked, hence the use of matched pairs at each library. As mentioned above, notes were taken on such differences to substantiate this belief, and as the study progressed the soundness of the belief became more and more evident. Examples of factors that differed from library to library and that were judged to affect reference performance seriously are space problems forcing the separation and special shelving of portions of the reference collection, location of part of the adult non-fiction circulating collection or magazine collection in areas at a distance from the reference desk or card catalog, size and content of separate "ready reference" collections located near the desk, and policies of the libraries regarding the classification of reference-type materials to circulate.

These differences could be observed and recorded in only a gross and sometimes rather subjective way, so that the information obtained about them was not considered precise or complete enough to score or treat statistically. This means that the only way to account for or hold constant these inter-library differences was to keep the members of each pair together throughout the analyses. In many instances it would be very interesting to see what relationship existed between differences on a given variable, e.g., years of experience, and differences in performance, among all trained librarians, all untrained staff members, or all participants, disregarding the pair to which they belonged. Since the meaning of any apparent relationship found in such cross-library analyses would be brought into question by the failure to account for the effect of inter-library differences, such analyses are not attempted in Chapter II, where performance is related to the independent variables. Several of these factors noted at the various libraries will be discussed throughout Chapter III, in terms of how they were judged to relate to the reference technique or procedure of individual participants.

One variable that differed from library to library and on which fairly objective data was available was collection size. Originally it had been thought that the size of the reference collection might have a significant differential effect on the performance of trained and untrained staff members. However, it was found that the participants moved so freely between the reference collection and the adult circulating collection that the size of the adult collection of the central or headquarters library was considered a better measure of the collection of materials with which the individual participants had to work. It was this figure that was asked for in the interview with the supervisors. Findings concerning this factor are reported on pages 36 and 37.

Pretesting

Pretesting of the various data collecting devices and procedures was done in several stages. After the instruments were initially constructed they were tried with a staff member in a local public library. Several major changes were made as a result of this trial. The procedure was then repeated in another nearby public library. This time minor changes were made. Finally, pretest trips as possible to the anticipated field visits were made to two medium-sized public libraries in surburban Chicago. Changes in the instruments and procedures made as a result of these visits were few, and it was judged that sufficient practice had been obtained in timing and recording for the actual field visits to begin.

Scheduling the Visits

The visits to the participating libraries were scheduled so that the better part of two working days could be spent in each library (more, of course, in the library with three pairs). This gave time for two half-day sessions with each participant, one in which to ask the test questions and one during which to observe actual reference work with patrons. The former was often in the morning, when the reference department was not too busy and a staff member could be spared to give full and complete attention to the test. The latter was always during the afternoon or evening, when the department was expected to be busiest. In addition, time was allowed for interviews, as mentioned above. Finally, as was noted above, at each library there was opportunity for informal visits, during which relevant and useful information, not anticipated at the time the interview schedules were drawn up, was gathered. The field visits were made during October and November of 1966.

Footnotes to Chapter I

[1] "Library Education and the Talent Shortage," Library Journal, XCI (April 1, 1966), 1761-73; see also Dorothy Bendix (ed.), "Library Education and the Shortage. . . ," Library Journal, XCI (October 15, 1966), 4881-98.

[2] David C. Mearns, "Master of Materials. . . ," Catholic Library World, XIX (May, 1948), 249-51.

[3] Joseph L. Wheeler and Herbert Goldhor, Practical Administration of Public Libraries (New York: Harper & Row, 1962), pp. 317, 323-24.

[4] Samuel Rothstein, "The Measurement and Evaluation of Reference Service," Library Trends, XII (January, 1964), 456-72.

[5] Mary N. Barton and Ellen F. Watson, General Reference Department Staff Manual (Baltimore: Enoch Pratt Free Library, 1950), p. 36.

[6] John A. McCrossan, Library Science Education and its Relationship to Competence in Adult Book Selection in Public Libraries ("Research Series," No. 9; Springfield: Illinois State Library, 1967), pp. 4-8.

[7] Ibid., p. 8.

[8] Rothstein, loc. cit.

[9] Louis Shores, Basic Reference Sources (Chicago: American Library Association, 1954), pp. 5-8.

[10] Wheeler and Goldhor, op. cit., pp. 313-37.

[11] Paul F. Breed, "An Analysis of Reference Procedures in a Large University Library" (unpublished Master's thesis, Graduate Library School, University of Chicago, 1955).

[12] Ibid., pp. 46, 53.

[13] Frank G. Jacobs, "An Analysis of Reference Inquiries in a Technical Library" (unpublished Master's thesis, Graduate Library School, University of Chicago, 1959).

[14] Edith Guerrier, "The Measurement of Reference Service," Library Journal, LXI (July, 1936), 529-31.

[15] Ibid.

[16] Margaret Hutchins, Introduction to Reference Work (Chicago: American Library Association, 1944), pp. 30-35.

[17] Shores, op. cit., pp. 9-10.

[18] Jesse Shera, "Automation and the Reference Librarian," RQ, III (July, 1964), 3-7.

[19] Mary L. Bundy, Reference Service in American Public Libraries Serving Populations of 10,000 or More. . . ("Occasional Papers," No. 61; Urbana: University of Illinois Library School, 1961), pp. 13-14.

[20] Guerrier, loc. cit.; see also Dorothy E. Cole, "Some Characteristics of Reference Work," College and Research Libraries, VII (January, 1946), 45-51; and Rothstein, loc. cit.

[21] Charles A. Bunge, "Library Education and Reference Performance," Library Journal, XCII (April 15, 1967), 1578-81.

[22] Statistics were taken from the following compilations: "Statistics of Library Service in Illinois, 1964-1965," Illinois Libraries, XLII (October, 1965), 732-49; Indiana State Library. Statistics of Indiana Libraries, 1965 (Indianapolis: The Library, 1966); "Statistics of Iowa Public Libraries. . . 1965," Iowa Library Quarterly, XX (January, 1966), 49-69; Missouri State Library, Fifth-Eighth Annual Report, 1964-65 (Jefferson City: The Library, 1966); Wisconsin Public Libraries, Service Record. . . 1964 (Madison: Division of Library Services, 1966); and American Library Directory (24th ed.; New York: R. R. Bowker Company, 1964).

[23] "The Bulletin Board," ALA Bulletin, LX (July-August, 1966), 684; see also "Reference Questions," Library Journal, XCI (July, 1966), 3292; and "Questions Wanted," RQ, VI (Fall, 1966), 21.

[24] Martha Conner, "What a Reference Librarian Schould Know," Library Journal, LII (April 15, 1927), 416-18; see also Dorothy E. Cole, "Some Characteristics of Reference Work," College and Research Libraries, VII (January, 1946), 45-51; and Florence Van Hoesen, "Analysis of Adult Reference Work in Public Libraries. . ." (unpublished Ph.D. dissertation, University of Chicago, 1948), pp. 43-53.

[25] Mabel L. Conat, "Detroit P. L. Surveys Reference Use," Library Journal, LXXII (November 15, 1947), 1569-72.

[26] Carter Alexander, "Technique for Library Searching," Special Libraries, XXVII (September, 1936), 230-38.

[27] Barton, *op. cit.*, pp. 63-64.

[28] Hutchins, *op. cit.*, pp. 30-35.

CHAPTER II

FINDINGS: GENERAL

The preceding chapter outlined procedures followed in gathering the data for this study. This chapter is the first of two that will detail the findings resulting from these procedures. Here the relationships between the two major variables, professional training and question-answering performance, will be discussed, as well as the relationship between performance and the several other variables mentioned in the previous chapter. The proposed causal element, i.e., the technique or procedure used in finding answers, will be analyzed in the next chapter.

Table 1 in Appendix A shows the number of questions attempted, answered correctly, and not answered correctly by each participant. An X represents a question answered correctly, and an 0 designates a question not answered correctly. Dashes have been used to indicate questions not attempted. Table 2 in Appendix A lists the number of minutes used by each participant on each question attempted. Table 3 contains summary data from Tables 1 and 2. Parts of this data are repeated in more convenient smaller tables throughout this chapter.

The scores reported throughout this chapter were arrived at by taking the arithmetic average between two basic units. The first of these consists of questions 1-17 on the test set and the time spent attempting to find answers to them. This unit was used because it comprised the basic test set and because each participant attempted each of these questions in the same order, making it useful for comparison. The other unit is the first 100 minutes of actual question-answering time and the questions attempted during that time. This unit was also used because of its comparability among all participants. Each staff member spent at least 100 minutes actually seeking answers to questions presented in the same order. Since some participants answered more and thus different questions in 100 minutes than did others, the scores on this unit may not be quite as comparable as that on the first 17 questions, and yet it seemed desirable to use these scores since they utilized information on a broader range of effort for many participants. Scores on both units are presented in Table 3 in Appendix A. It was considered that averaging these two units would use information from both, while minimizing any bias present in either one alone.

Professional Education and Reference Performance

This section will present the findings on the relationships between formal library education and the speed and accuracy with which the test reference questions were answered. The former variable will be treated as a dichotomy, with the nine staff members having fifth-year library degrees (designated as "trained" throughout this report) being compared with the nine having little or no formal library education (designated "untrained"). The findings on the performance variable will be presented in a number of ways, which should become clear as the report progresses.

The basic statistical test used to test the significance of the various relationships found is the Wilcoxon matched-pairs signed-ranks test.[1] The choice of this test was dictated by several factors. First, very little is known about the parameters of the population from which the study cases were drawn, hence a nonparametric test is more appropriate. In addition, the level of measurement achieved was considered to be that of ranking, ruling out tests requiring higher levels of measurement on the variables. Finally, the study design used matched pairs, rather than independent samples, further limiting the choice of appropriate tests.

Briefly, the rationale of this test is as follows. The independent variable constitutes two treatments, A and B (here training and lack thereof), and the research hypothesis predicts an effect on the scores representing the dependent variable. Each pair has a difference on the dependent variable which can be ranked according to the magnitude of the difference, regardless of its direction. If treatments A and B are really equivalent, that is if the null hypothesis is true, one would expect some of the larger differences to favor treatment A and some to favor treatment B. Thus, if the ranks favoring treatment A, e.g., positive, were summed and the ranks favoring treatment B, e.g., negative, were summed, the two sums should be about equal. But if the sums were very much different, one would infer that treatment A differs from treatment B, and thus would reject the null hypothesis and hold the research hypothesis tenable (assuming the difference was in predicted direction).

The Wilcoxon test uses the statistic T, which is the smaller sum of the like-signed ranks. The ditribution of the statistic T has been calculated, and tables or formulas can be used to determine critical values for various levels of significance, that is, the probability of occurrence of such values for T if the variables were not related. The null hypothesis predicts similar sums of the negative and positive ranks, producing a large T. A small T would indicate a difference in treatments and is what is required to reject the null hypothesis in favor of the research hypothesis. In the calculation of T where there are pairs with no difference, the procedure recommended by Hays is used.[2]

Accuracy, as related to library education.--One of the fears underlying the staffing norm or principle from which the study hypothesis was derived is that untrained staff members will more often fail to answer reference questions correctly, thus compromising a basic function of the library.[3] Counting accuracy alone, the data from the participants were examined in terms of the number of questions answered correctly among the first seventeen and the number answered correctly of those attempted in the first 100 minutes of answering time. The results are shown in Table 3. It will be noted that the differences are quite small in most cases. In general, the trained members of the pairs appear to have answered correctly a larger proportion of the questions attempted. However, the table shows that among the three pairs where differences were largest, for one pair the direction of the difference was in favor of the untrained member. Thus, the T value is so large that the null hypothesis of no difference can be rejected only at a level considerably above .05, indicating that the apparent difference is not statistically significant.

TABLE 3

RATIO OF QUESTIONS ANSWERED CORRECTLY TO QUESTIONS ATTEMPTED RELATED TO LIBRARY EDUCATION

Pair	Trained Member	Untrained Member	Difference	Rank of Difference	Negative Ranks
A	.92	.77	.15	8	
B	.86	.86	.00	1.5	
C	.95	.91	.04	3.5	
D	.88	.94	(-).06	(-)5.5	5.5
E	.88	.82	.06	5.5	
F	.88	.98	(-).10	(-)7	7
G	.95	.95	.00	(-)1.5	1.5
H	.98	.94	.04	3.5	
I	.83	.66	.17	9	
				T =	14

To be more specific, some reference administrators would undoubtedly say than an incorrect or misleading answer, on which a patron might base a wrong decision, is worse than simply failing to find an answer to a question. Accordingly, the number of times the participants gave incorrect answers was checked. On the first 17 questions only one incorrect answer each was given by two participants, one trained and one untrained. In 100 minutes of answering time one question was answered incorrectly by each of four trained staff members and one each by three untrained staff members. A comparable small difference was found regarding partially correct answers that were scored as "not answered correctly." At the level of the factual questions represented on the test instrument, then, the fear of a significant difference in accuracy between trained and untrained reference staff members finds little support from this study.

Speed, as related to library education.--To compare the speed with which the trained and untrained participants dealt with questions asked them, regardless of the outcome of the action, the test results were scored in terms of the time taken per question attempted. The findings are shown in Table 4. It should be noted that higher scores on this table indicate slower speeds, since the figures represent average minutes required to work on a question. In all cases but one the trained members were faster. The probability of this happening if the variables were not related is small, and the null hypothesis can be rejected at the .025 significance level.

TABLE 4

MINUTES TAKEN PER QUESTION ATTEMPTED
RELATED TO LIBRARY EDUCATION

Pair	Trained Member	Untrained Member	Difference	Rank of Difference	Positive Ranks
A	5.23	5.42	.19	1	
B	4.98	5.50	.52	4	
C	3.14	3.87	.73	6	
D	5.28	4.66	(+).62	(+)5	5
E	4.14	6.49	2.35	9	
F	4.14	4.36	.22	2	
G	3.86	5.25	1.39	8	
H	3.55	5.91	1.36	7	
I	5.02	5.26	.24	3	
					T = 5

Again, more specifically, some administrators fear that reference staff members lacking formal training will not know the information sources of the library well enough to know when to stop on a question to which an answer cannot be readily found and will thus unduly waste the time of the patron. To test this assumption the results of the test were examined to compare how many times the trained and untrained participants failed to decide to give up on an unanswered test question before the rather arbitrary 15-minute time limit mentioned above (assuming that those who gave up with no answer would have in the real situation referred the patron to another staff member or asked the patron to call back later). There was some difference found, though assessing its significance is difficult. Two untrained staff members would have exceeded the 15-minutes limit on two questions each and another on one. Among the trained librarians, only one participant failed to answer or give up on only one question within the time limit. This point will be considered again in the next section.

Efficiency, as related to library education.--Combining accuracy and speed, a score can be arrived at which might be called reference performance efficiency. That is, by combining the total time spent attempting questions and the number of questions answered correctly during that time, the participants can be scored with regard to the efficiency of their performance. Table 5 shows the results of this analysis. Again, it should be noted that a higher score represents lower efficiency. In all cases but two the trained members of the pairs were more efficient than were the untrained members, and these two cases had differences among the smallest. The probability of obtaining such a small T value would be very small if the variables were unrelated, and the null hypothesis can be rejected at the .025 level, thus adding to the credibility of the study hypothesis.

The one study, cited in the literature survey above, which concluded that staff members lacking formal library education should be able to answer a large portion of public library reference questions, based this conclusion on the assumption that such staff members would be able to refer questions for which they could not find answers quickly to librarians with more education.[4]

TABLE 5

MINUTES TAKEN PER CORRECT ANSWER
RELATED TO LIBRARY EDUCATION

Pair	Trained Member	Untrained Member	Difference	Rank of Difference	Positive Ranks
A	5.70	7.03	1.33	5	
B	5.75	6.42	.67	2	
C	3.28	4.24	.96	3	
D	5.94	4.92	(+)1.02	(+)4	4
E	4.70	7.94	3.24	9	
F	4.70	4.44	(+) .26	(+)1	1
G	4.07	5.56	1.49	6	
H	3.62	6.28	2.66	8	
I	6.02	7.99	1.97	7	
					T = 5

In fact, as mentioned above, it is considered good reference practive for any staff member not to waste his own or the patron's time while searching an unduly long time for an answer to a question, but rather either to refer the question to another staff member or to take the patron's name, in order to contact him later with the results of an extended search. Thus, it might be of interest to see the comparison between trained and untrained staff members, if the decision to give up on a question (assuming this implies a referral or "call back") is considered a correct course of action.

Table 6 shows the findings on this point. As expected, many of the staff members show an improvement in their efficiency score (again, indicated by a lower figure). The improvement is more general among the trained staff members, indicating that they decided to "refer" relatively more often. With this scoring, in only one pair did the untrained member perform more efficiently than the trained member, and the difference in this pair was among the smallest. Thus the null hypothesis can be rejected at well below .025.

TABLE 6

MINUTES TAKEN PER CORRECT ANSWER OR REFERRAL
RELATED TO LIBRARY EDUCATION

Pair	Trained Member	Untrained Member	Difference	Rank of Difference	Positive Ranks
A	5.23	6.12	.89	4	
B	5.42	6.42	1.00	5	
C	3.20	3.94	.74	3	
D	5.60	4.92	(+).68	(+)2	2
E	4.44	7.94	3.50	9	
F	4.44	4.44	.00	1	
G	4.07	5.25	1.18	7	
H	3.55	6.28	2.73	8	
I	5.32	6.38	1.06	6	
					T = 2

It should be noted that the decision to give up on a question could be merely an indication of a lack of tenacity, which could work to a patron's disadvantage as well as to his advantage, particularly if the staff member were on duty alone when the answer was needed. In any case, whether the preferred scoring interpretation is to count a decision to give up as "not answered correctly" or to score such a decision as a correct course of action, there is reason for accepting the hypothesis that professional education makes a significant difference in reference performance efficiency.

Other Variables Related to Performance

This section will consider relationships between reference performance and several variables other than formal library education. The ways in which these different variables were measured andscored are discussed in the preceding chapter on pages 14 to 16. The measure used to indicate performance will be efficiency scores presented in Table 5 above. Thus, it should be remembered that a higher score represents lower efficiency. Two approaches will be used in examining relationships between variables. In some cases the factor under consideration will be treated as a dichotomy, and each pair will be split according to which member has more or less of the variable, rather than according to being trained or untrained. Then this dichotomy will be related to performance and the relation tested by the Wilcoxon test used in the last section. The second type of analysis will be to relate rankings achieved by the pairs on variables to relative amounts of difference in performance. That is to say, attempts will be made to see if high or low rankings for pairs on different factors are related to larger or smaller differences in the performance of the same pairs.

There are two main reasons for discussing these other variables. First, since this study was done as a field study, it was not possible to control all relevant variables, and thus other hypotheses built on other variables might be tenable alternatives to the study hypothesis. If it can be shown that splitting pairs according to the members' having more or less of these alternative independent variables produces no significant relationship to performance, then these alternative hypotheses will lose credibility, and the credibility of the main hypothesis will be strengthened. Likewise, if it can be shown that larger differences on a given variable between members of individual pairs are not strongly related to larger differences in reference performance between the members of the same pairs, the given variable will be less likely to be considered as a tenable alternative independent variable to professional education. Secondly, even if a variable does not present itself as figuring in an alternative hypothesis, it might be of value to gain information on its operation in the reference situation. For example, in a practical situation it should be of interest to know which variables were found in this study to be related to the amount of spread in efficiency between trained and untrained staff members and how they were related. These relationships, then, will be discussed also.

Age as a variable.--Contrary to expectations based on the investigator's experience, in seven of the nine pairs studied the untrained staff member turned out to be older than the trained participant (see Table 2, p. 9). It could thus be hypothesized that being younger is significantly related to higher reference efficiency, as an alternative to the study hypothesis. To test this, the pairs were split on the basis of being older or younger and their performance studied. Table 7 shows the results. In two of the nine pairs the older participant performed more efficiently than the younger, and one of them had the largest difference in performance. The T value derived was so large that the null hypothesis could be rejected only at a significance level in excess of .10, thus weakening the credibility of age as an alternative independent variable to professional education.

TABLE 7

MINUTES TAKEN PER CORRECT ANSWER
RELATED TO AGE

Pair	Older Member	Younger Member	Difference	Rank of Difference	Negative Ranks
A	7.03	5.70	1.33	5	
B	6.42	5.75	.67	2	
C	4.24	3.28	.96	3	
D	4.92	5.94	(-)1.02	(-)4	4
E	4.70	7.94	(-)3.24	(-)9	9
F	4.70	4.44	.26	1	
G	5.56	4.07	1.49	6	
H	6.28	3.62	2.66	8	
I	7.99	6.02	1.97	7	
					T = 13

Time elapsed since formal education as a variable.--One factor advanced by some of the participants to explain anticipated differences in performance was the difference in amount of time that had passed since they were actually in school. These persons considered that the formal education situation, regardless of subject studied, enhances of forces the development of certain mental capacities, e.g., speed and flexibility, which help greatly in reference work and which decay over time, giving an advantage in reference work to the person who has been out of school the shorter time. The amount of time since schooling ended was treated as a variable and was related to reference efficiency, much as was age. Table 8 shows the years elapsed since the last formal education for each participant. Table 9 shows the results of dichotomizing time elapsed since schooling and relating it to

TABLE 8

YEARS ELAPSED SINCE END OF FORMAL SCHOOLING

Pair	Untrained Member	Trained Member	Difference
A	0	1	-1
B	10	2	8
C	13	3	10
D	18	5	13
E	21	15	6
F	30	15	15
G	29	16	13
H	35	20	15
I	41	19	22

performance. In three cases staff members away from school longer scored better (indicated by a lower figure) than did the other members of the pairs, thus the T values obtained were too large to indicate a significant difference in performance related to time away from the formal school situation.

TABLE 9

MINUTES TAKEN PER CORRECT ANSWER RELATED TO YEARS AWAY FROM SCHOOL

Pair	Member Out of School More Years	Member Out of School Fewer Years	Difference	Rank of Difference	Negative Ranks
A	5.70	7.03	(-)1.33	(-)5	5
B	6.42	5.75	.67	2	
C	4.24	3.28	.96	3	
D	4.92	5.94	(-)1.02	(-)4	4
E	7.94	4.70	3.24	9	
F	4.44	4.70	(-) .26	(-)1	1
G	5.56	4.07	1.49	6	
H	6.28	3.62	2.66	8	
I	7.99	6.02	1.97	7	
				T =	10

Reference experience as a variable.--Since amount of previous reference experience was held constant as much as possible for each pair, experience does not present itself as an alternative independent variable to professional education. However, an ancillary hypothesis of the study was that as reference experience of the pairs increased, the amount of difference in performance between the trained and untrained members would decrease, because on-the-job learning gained by the untrained staff members would enable them to "catch up" with the trained librarians in reference ability at the level of the factual questions used for this study. To check this hypothesis a rank order correlation between the amount of difference in performance for each pair was calculated using the Spearman rank order correlation coefficient (r_s). The results are shown in Table 10. It will be noted that here and throughout the rest of the report the rankings used in calculating the rank order correlation are different from those used in the Wilcoxon test. This is because in the Wilcoxon test the absolute value of the difference is used to determine the ranks, disregarding the direction or algebraic sign. In the Spearman rank order correlation the algebraic value is taken into consideration and the ranks assigned accordingly. In the tables for correlation, "d" indicates the differences in rank and "d^2" indicates the differences squared.

TABLE 10

RELATIONSHIP BETWEEN YEARS OF EXPERIENCE AND DIFFERENCE IN PERFORMANCE

Pair	Years of Experience	Differences in Performance	Rank Exp.	Rank Perf.	d	d^2
A	1.50	1.33	1	5	-4	16
B	2.25	.67	2	3	-1	1
C	3.00	.96	3	4	-1	1
D	3.75	-1.02	4	1	3	9
E	7.50	3.24	6	9	-3	9
F	6.50	- .26	5	2	3	9
G	10.00	1.49	7	6	1	1
H	11.00	2.66	8	8	0	0
I	19.50	1.97	9	7	2	4
					Σd^2 =	50
					(r_s =	.583)

The hypothesis mentioned above would predict that as years of experience increased, amount of difference in performance would decrease, or a negative correlation. A positive correlation was found, indicating that the data from this study give no support to the hypothesis. This hypothesis, of course, rests on the assumption that the quality and amount of on-the-job learning would be the same for all untrained participants over a given amount of time. As will be seen in the following section, this was not the case in this study, explaining to some extent the negative results. Also, experience was fairly closely related to other intervening variables in this study.

In-service training and supervision as a variable.--As was mentioned in Chapter I, this variable is really a construct composed of several factors. Since this was found to be a meaningful variable only for the untrained members of the pairs, it is not an appropriate factor to figure in an alternative hypothesis to the one which guided the study. However, it should be interesting to see if an increase in the relative amount of in-service training and supervision is related to the relative amount of difference in performance among pairs. Table 11 shows the correlation between the ranks assigned to the untrained members of each pair, with regard to the construct, and the rank of the difference in performance. As might be predicted, a negative correlation was found, meaning that as amount of opportunity for on-the-job learning by untrained staff members went up, the efficiency of the untrained staff members approached that of the trained members of the same pairs.

TABLE 11

RELATIONSHIP BETWEEN IN-SERVICE TRAINING AND DIFFERENCE IN PERFORMANCE

	Rank			
Pair	In-Service Training	Difference in Performance	d	d^2
A	9	5	4	16
B	7	3	4	16
C	5.5	4	1.5	2.25
D	8	1	7	49
E	1.5	9	-7.5	56.25
F	4	2	2	4
G	3	6	-3	9
H	1.5	8	-6.5	42.25
I	5.5	7	-1.5	2.25
			$\Sigma d^2 =$	197.00
			$(r_s =$	$-.642)$

Duties regularly performed other than answering questions.--One hypothesis that can be advanced to predict or account for the trained librarian's being more proficient at answering reference questions is that the duties and responsibilities assinged to the trained librarian by his supervisors, and the learning provided thereby, better equip him to answer reference questions than those duties assigned to untrained staff members. When the information gathered to test this hypothesis was examined, the duties that appeared to be the most likely to have any such effect, as well as the only group of duties showing enough pattern to score and treat statistically, were those connected with selecting and handling or examining new reference materials. Other specific duties regularly performed will be related to reference procedure in the next chapter.

Table 12 gives the rankings arrived at on examination of the data bearing on these duties. Reference to one of the previous tables that contain the efficiency scores will show that in every pair where the trained participant had a larger amount of responsibility for selecting and handling reference materials the professional scored better in performance, and in the one pair where the untrained participant worked more closely with selecting adult reference materials (in this pair the trained member worked only part-time) the untrained member performed more efficiently. In addition, relatively high correlation coefficients were found (Table 13) between ranks of the difference the members of each pair were judged to have on this variable and the ranks of the difference in their performance, indicating that the more widely they were separated in involvement with selecting and handling reference materials the more widely they were separated in reference performance.

TABLE 12

DUTIES INVOLVING REFERENCE BOOKS
ASSIGNED TO PARTICIPANTS

Pair	Trained Member	Untrained Member	Rank of Difference
A	(Little or not difference)		3
B	More	Fewer	5
C	More	Fewer	6
D	Fewer	More	1
E	More	Fewer	8
F	(Little or no difference)		3
G	(Little or no difference)		3
H	More	Fewer	7
I	More	Fewer	9

TABLE 13

RELATIONSHIP BETWEEN DIFFERENCES IN REFERENCE BOOK DUTIES AND DIFFERENCES IN PERFORMANCE

	Rank			
Pair	Difference in Duties	Difference in Performance	d	d^2
A	3	5	-2	4
B	5	3	2	4
C	6	4	2	4
D	1	1	0	0
E	8	9	-1	1
F	3	2	1	1
G	3	6	-3	9
H	7	8	-1	1
I	9	7	2	4
			Σd^2 =	28
			(r_s =	.767)

This hypothesis, which receives support here, is a logical one. One would expect the increased familiarity with information sources, gained through procedures involved in selecting the materials and handling them after receipt by the library, would have a beneficial effect on finding answers to questions in these same sources. On the other hand, accepting it as an alternative to the study hypothesis raises certain problems. First, it fails to account for substantial differences in performance between the members of two of the three pairs judged to have little difference in regard to responsibilities for selecting and handling reference materials. Also, the direction of any causal relationship between the present two variables is difficult to judge. It seems possible that those untrained staff members who had responsibilities for book selection similar to their trained colleagues had these duties assigned to them because they were already similar in reference ability, not vice versa. Involvement with reference book selection and processing is probably one variable among others that contribute to the differential ability of reference staff members to answer questions efficiently.

Amount of time spent answering questions.--Several participants in this study mentioned that they considered the actual number of hours per week a staff member spent at the desk answering reference questions important to reference performance. They seemed to think that spending more time at the desk, and thus presumably answering more questions, helped a staff member to be able to decide more quickly on appropriate answering sources and to find those chosen more quickly. The majority of pairs studied here had little or no difference in the amount of time per week the members were assigned to the reference desk, as can be seen from Table 14, so that little could be done to test this belief.

TABLE 14

HOURS PER WEEK ASSIGNED TO ANSWERING
REFERENCE QUESTIONS

Pair	Trained Member	Untrained Member	Difference
A	26	25	1
B	40	40	0
C	8+	15	-7
D	8	25	-17
E	12-15	10	2-5
F	12-15	12-15	0
G	30	18-20	10-12
H	12-15	12-15	0
I	15	15	0

It can be noted from Table 14 and one of the earlier tables which shows the efficiency scores that in the library where three pairs were studied (E, F, and G) the participant with the most hours per week assigned to answering reference questions did have the highest efficiency, and the participant with the fewest hours per week had the lowest efficiency. However, other ranks do not correlate so neatly, nor do the magnitudes of the differences in time assigned to the desk and the differences in performance correlate. Also, while one pair in which the untrained member worked substantially more hours per week (D) was the same pair where the untrained member performed considerably more efficiently, the same relationship does not hold for pair C. In short, while the belief of the participants who raised the question of relationship between amount of time spent answering questions and level of efficiency might be tenable, and even though there is some apparent justification for it in the test scores, support provided by the present study is not substantial.

Formal reference training as a variable.--One factor which might be expected to affect the amount of difference between the reference ability of a trained staff member and an untrained one is the amount and type of formal reference education the trained librarian has had. The information from the interviews concerning this factor is presented in Table 15. In the column headed "Type and Emphasis of Courses" are shown the results of a question asking about the emphasis and content of the courses. For each librarian there is an indication of whether or not the library school attended was accredited by the American Library Association, followed by an indication of whether or not the courses had an emphasis on a particular type of library.

Next, the degree to which the technique or procedure for answering reference questions was emphasized in the courses is noted. This is to be understood as relative to the typical emphasis on titles and characteristics of particular reference books. Finally, there is an indication of whether or not practice questions were used as a teaching technique in the courses.

TABLE 15

NUMBER AND TYPE OF FORMAL
REFERENCE COURSES

Trained Participant	Number of Courses	Type of Emphasis of Courses
A1	1	Unaccredited program; school library emphasis; little or no attention to technique.
B1	3	Accredited program; broad emphasis; some attention to technique; practice questions used.
C1	3	Accredited program, broad emphasis; considerable attention to technique; practice questions used.
D1	2	Unaccredited program; school library emphasis; slight attention to technique.
E1-F1	Parts of 5 literature and bibliog. courses	Accredited program; broad emphasis; some attention to technique, but more on materials.
G1	2	Accredited program; broad emphasis; considerable attention to types of tools and techniques; practice questions asked.
H1	3	Accredited program; broad emphasis; some attention to technique; practice questions used.
I1	2	Accredited program; broad emphasis; slight attention to technique; practice questions used.

Except for the two participants who took their professional degrees from school library programs, the differences on this factor are not great and would be hard to score or deal with objectively. It is tempting to look at the high scores on time required per correct answer, indicating low efficiency, for these two librarians and to conclude that the amount and quality of their reference education hampered their ability. However, this still involves rather risky cross-library comparisons and does not account for other factors such as amount of experience (low in both cases), etc. A more legitimate comparison would be to look at the relative size of the difference in performance for the two pairs involving these participants and for the other pairs. As the study progressed it did appear to the investigator that these two participants who had their library education from essentially school library programs did indeed have less advantage in performance over their untrained mates. In fact, some specific instances where there seemed to be a connection between reference course content and technique or procedure will be discussed in the following chapter. However, when all the questions were scored and analyzed it was seen that while one of these trained participants was exceeded in efficiency by the untrained member of the pair, the other such trained member performed considerably above the untrained member of that pair. Thus something less than conclusive evidence was found for the effect of the nature of reference education on reference performance.

Collection size as a variable.--If the ability of untrained staff members to answer reference questions were in fact based on memory and direct acquaintance with as many information sources as possible, while the trained librarian relies on a more logical or indirect access to sources, then one might predict than any advantage in performance enjoyed by the trained librarian would lessen as the size of the available collection of sources decreases. To test this prediction the sizes of the central adult collections were correlated with the sizes of the differences in performance between the trained and untrained members of the pairs.

Table 16 shows the size of the adult reference collection and of the central adult circulating collection for each library studied. While data on the number of titles in the reference collections were gathered and are presented here for any value or interest they might have, because of differing policies from library to library regarding the composition of the reference collection, the size of the central adult collection was judged a better indicator of the range of materials available for answering questions. It will be noted that while there are only seven libraries, ranks were assigned on the basis of nine, since three pairs worked at library number 5.

TABLE 16

SIZE OF REFERENCE AND CENTRAL ADULT CIRCULATING COLLECTIONS

Pair	Library	Volumes in Central Adult Collection	Rank	Titles in Adult Reference Collection
A	1	87,600	8	2,000
B	2	75,000	7	2,100
C	3	38,000	2	700
D	4	106,700	9	4,300
E	5	65,100	5	3,800
F	5	65,100	5	3,800
G	5	65,100	5	3,800
H	6	35,800	1	1,500
I	7	38,500	3	2,500

Table 17 shows that a negative correlation was found between rank of collection size and rank of the size of the performance difference. This indicates that, contrary to prediction, as collection size of the libraries studied increased, the differences in performance between the trained and untrained participants tended to decrease. This, of course, has implications to the reference procedure or technique of the staff members and will be discussed in more detail in the following chapter (see pages 58 and 59).

Non-library education.--As can be seen from Table 2, page 9, in all pairs but C, E, and I the amount of education other than library science was quite comparable for each pair. The major subjects studied in non-library education were too lacking in pattern of variability to relate meaningfully to performance efficiency. Seven of the eighteen participants majored in English, three in history, three in general liberal arts programs, two in secondary social studies education, and one each in biology, home economics, and elementary education. Some attempt was made to relate subject of non-library education specialization to reference technique or answering success on various specific questions, but no relationship emerged to be reported.

The pairs in which the trained members had considerably more non-library education than the untrained members ranked relatively high on difference in performance, meaning that it might be hypothesized that amount of non-library education is crucial to performance difference. However, in this study such a hypothesis accounts for relatively little of the difference found between

TABLE 17

RELATIONSHIP BETWEEN SIZE OF ADULT COLLECTION AND DIFFERENCE IN PERFORMANCE

Pair	Collection Size	Difference in Performance	d	d^2
A	8	5	3	9
B	7	3	4	16
C	2	4	-2	4
D	9	1	8	64
E	5	9	-4	16
F	5	2	3	9
G	5	6	-1	1
H	1	8	-7	49
I	3	7	-4	16
			Σd^2 =	184
			(r_s =	-.533)

members of pairs, since it says nothing of the six other pairs. Also, these three pairs had high rankings on variables which were related to performance and which did take all pairs into account. Finally, in studying differences in the way answers were sought as an explanation for differences in efficiency, none of the differences in technique could be traced to anything judged likely to have been based on non-library education.

Summary

This chapter has discussed the findings on the relationships between the reference performance of the nine pairs of participants and several other variables. There was some apparent relationship between having a professional library degree and answering the test questions accurately, but it was not statistically significant. Those participants with library training did handle the questions more quickly. Combining accuracy and speed, it was found that efficiency in reference performance was significantly related to having formal library education, as predicted by the study hypothesis.

Several variables were examined as potential alternative independent variables to professional education in accounting for the observed differences in reference efficiency. Age and time elapsed since the end of formal education were found not to bear any important relationship to differences in efficiency between members of the pairs. The amount of time per week actually spent answering reference questions and the amount of non-library education were related to differential performance for some pairs, but were judged not to receive conclusive support as alternative independent variables to library education. Finally, the prediction of a positive relationship between the relative amount of involvement with the selection and handling of reference materials and level of efficiency was supported, though the relationship was judged as contributory rather than crucial.

The size of the difference between trained and untrained members of a pair was considered of interest, since, for example, being able to predict the conditions under which a smaller difference would occur has practical implications. Thus, ranks on several variables were correlated with the magnitudes of the difference in the performance of the trained and untrained members of the pairs. Higher rankings on years of reference experience and difference in involvement with reference book selection were associated with larger differences in performance. High rankings on the variables of amount of in-service training for the untrained members and collection size were associated with smaller differences in performance between the trained and untrained members of the pairs.

The following chapter will examine the differences in the procedure used by the participants in searching for answers to the test questions, as these differences relate to accuracy and speed. As judgments are advanced regarding explanation for these differences in procedure related to difference in efficiency, it is hoped that the specific contributions to reference performance by the variables discussed above can be better understood.

Footnotes to Chapter II

[1] Sidney Siegel, Nonparametric Statistics (New York: McGraw-Hill Book Company, 1956), pp. 75-83.

[2] William L. Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), p. 637.

[3] Joseph L. Wheeler, "Bettering Reference Service," RQ, VI (Spring, 1967), 110.

[4] Edith Guerrier, "The Measurement of Reference Service," Library Journal, LXI (July, 1936), 529-31.

CHAPTER III

FINDINGS: REFERENCE PROCEDURE

Chapter II presented findings on the relationships between several independent variables, particularly professional training, and reference performance. This chapter will deal with findings concerning the hypothesized causal factor, the procedure used to find the answers to reference questions. It is intended that by examining the latter in this chapter a clearer understanding of the nature of the relationships found to exist in the previous chapter can be obtained.

The first section will duscuss the general procedure followed by the participants in searching for answers to the test questions. The following section will deal with differences in answering procedure that were judged crucial to differential efficiency.

Many of the decisions involved in the data tabulations supporting the findings in this chapter were necessarily of a judgmental and perhaps subjective nature. In addition, most of the indications reported here rest on small frequencies of occurrence, not admitting of statistical testing. For these reasons, this chapter is presented in a somewhat informal way, with much of the numerical detail omitted. Thus, this part of the report represents the most severe condensation of the dissertation mentioned in the preface, where much more detail can be found.

General Procedure Used By Participants

The causal element of the study hypothesis was based on implications from the literature of reference instruction and administration to the effect that the professionally trained reference staff member would have effective access to a greater portion of the informational content of a given library collection than would the untrained staff member. It was postulated that this more effective access would rest on a more logical step-by-step procedure for choosing answering sources, involving categorization and classification of the question, use of the bibliographic and indexing apparatus of the library, and pursuit of an answering strategy based on characteristics of the question. On the other hand, the untrained staff member, it was supposed, would rely on a procedure more akin to a simple stimulus-response reaction, with the question providing the stimulus and the response being recourse to one source after another, as dictated by experience and memory, until an answer was found or the possibilities exhausted.

This hypothesis would predict that the trained librarian would consult fewer sources as potential answering tools than would the untrained staff member. To test this prediction, the number of times each participant consulted a source with the expectation of finding the answer was recorded, excluding sources consulted for citations or leads to answering tools. Table 4 in Appendix A shows the results question by question. Table 18 below shows the results of a Wilcoxon test of the relationship between professional training and the number of tools used on questions 1-17. Contrary to prediction, in four of the nine pairs the untrained member used fewer tools than the trained member, producing a T that is much too large to indicate a significant relationship. Close examination of the observation schedules showed that it was much to simple to say that the efficient participants used a complicated rational answering procedure, while the less efficient participants used a simple procedure based on memory. In very general terms, the procedures used to locate answers to the test questions by trained and untrained participants were similar. Both the formally trained librarians and the staff members lacking training classified and categorized at least most of the questions; both groups used the bibliographic and indexing resources of the libraries; and both groups seemed to rely

TABLE 18

NUMBER OF ANSWERING SOURCES USED BY TRAINED AND UNTRAINED PARTICIPANTS

Pair	Trained Member	Untrained Member	Difference	Rank of Difference	Negative Ranks
A	40	39	1	2	
B	37	47	(-)10	(-)5	5
C	45	26	19	9	
D	39	50	(-)11	(-)6	6
E	52	49	3	4	
F	36	49	(-)13	(-)7	7
G	37	39	(-) 2	(-)3	3
H	49	33	16	8	
I	43	43	0	1	
					T = 21

more on rather ad hoc decisions, made as they proceeded through the searches, than on previously worked out strategies.

The chart on pages 44 to 46 represents an attempt to present a generalized version of the procedure used by the study participants to find answers to the test questions. This flow chart uses the conventional shapes to symbolize parts of the procedure. The diamond shaped box has been used for "yes-no" decisions or questions, the answers to which determine the subsequent direction of activity, as indicated by the arrows. The squares represent operations performed. The small pointed box indicates continuation of the chart on another sheet at the designated point. While it can be said that this is a fairly accurate representation of the procedure followed, almost every question and every participant produced some variations on the general pattern.

This chart was constructed by the following method. The observation schedules and the accompanying interview guides used to record the behavior and thoughts of the participants as they attempted to find answers to the questions were examined carefully. Those for the trained participants were examined as a group, and a generalized model for the procedures followed was abstracted. Likewise, the schedules for the untrained participants were studied and a general procedure abstracted. On comparison, the two general models were quite similar, and they were combined into the one flow chart presented on pages 44 to 46. Some of the decisions represented on the chart were not reported by the participants and were probably made at the subconscious level. However, from observed actins or reported conscious mental processes these decisions could be inferred. Also, many of the decisions were undoubtedly not of the simple "yes-no" nature represented on the chart, but rather involved a complex set of alternatives. However, for simplicity and clarity of presentation these complex decisions were broken down into their compontent "yes-no" parts for charting. Each of these basic decisions and the subroutines growing out of them will be discussed in turn below.

The first three basic decisions (A, B, C) represent rather quick responses to the question itself and its wording. Subroutine A was used when important words in the question were unfamiliar to the participants, when the question did not seem to contain enough information to indicate a direction of search, or when the participant judged that the search for the answer might be speeded by added information about the question. The most common immediate response to such a situation was for the participant to ask the "patron" if he could provide the needed information. If the "patron" could not add enough information, the participant looked for it elsewhere, depending on the nature of the difficulty. Even if useful additional information was not produced by this means, the participants usually elected to continue, using their best guess as to the subject or word meaning in question.

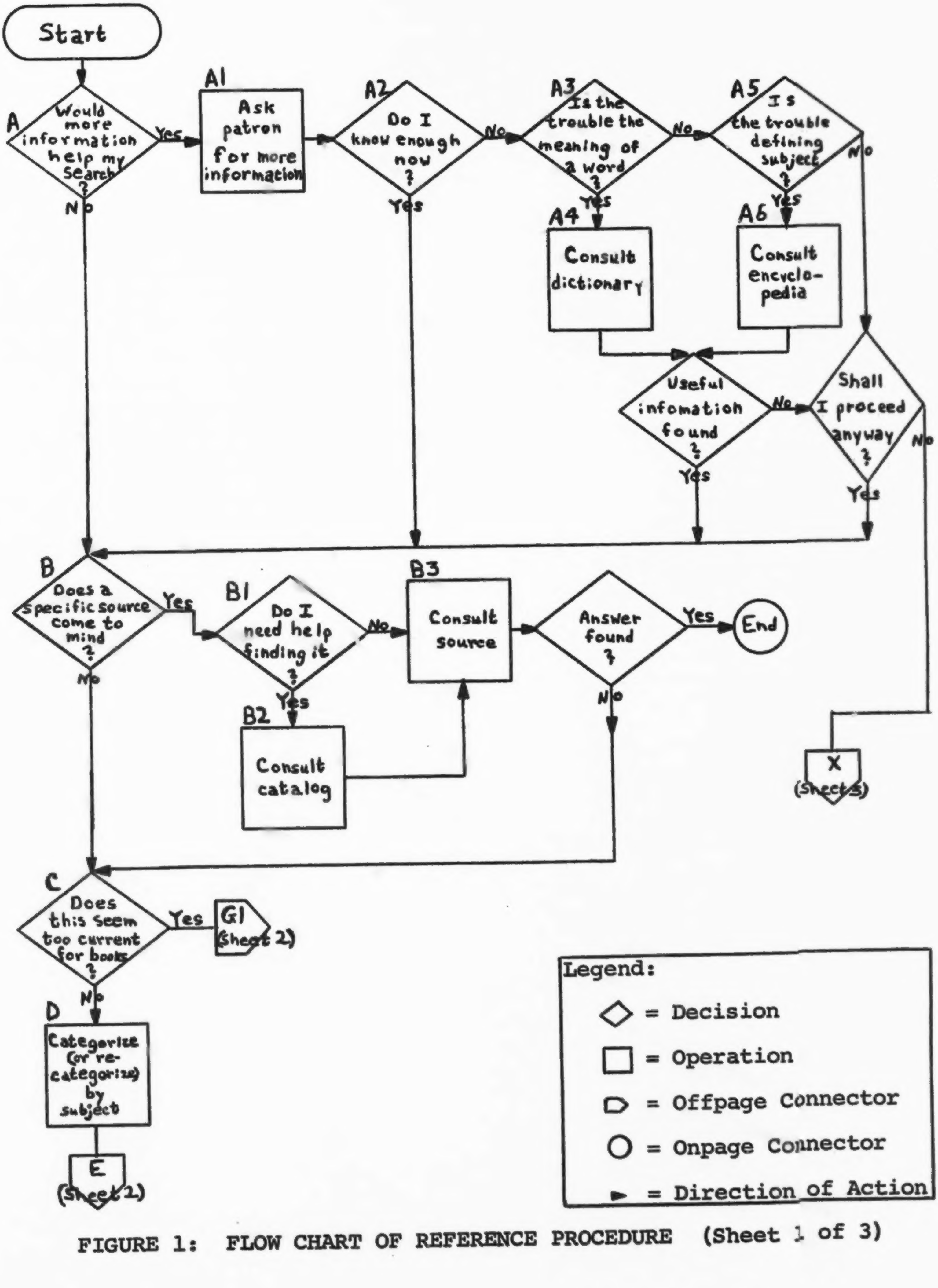
Start
A
Would more information help my search ?
Yes
No
A1
Ask patron for more information
A2
Do I know enough now ?
No
Yes
A3
Is the trouble the meaning of a word ?
No
Yes
A4
Consult dictionary
A5
Is the trouble defining subject ?
No
Yes
A6
Consult encyclo-pedia
Useful infomation found ?
No
Yes
Shall I proceed anyway ?
No
Yes
X
(Sheet 3)
B
Does a specific source come to mind ?
Yes
No
B1
Do I need help finding it ?
No
Yes
B2
Consult catalog
B3
Consult source
Answer found ?
Yes
No
End
C
Does this seem too current for books ?
Yes
No
G1
(Sheet 2)
D
Categorize (or re-categorize) by subject
E
(Sheet 2)
Legend:
◇ = Decision
☐ = Operation
= Offpage Connector
○ = Onpage Connector
► = Direction of Action

FIGURE 1: FLOW CHART OF REFERENCE PROCEDURE (Sheet 1 of 3)

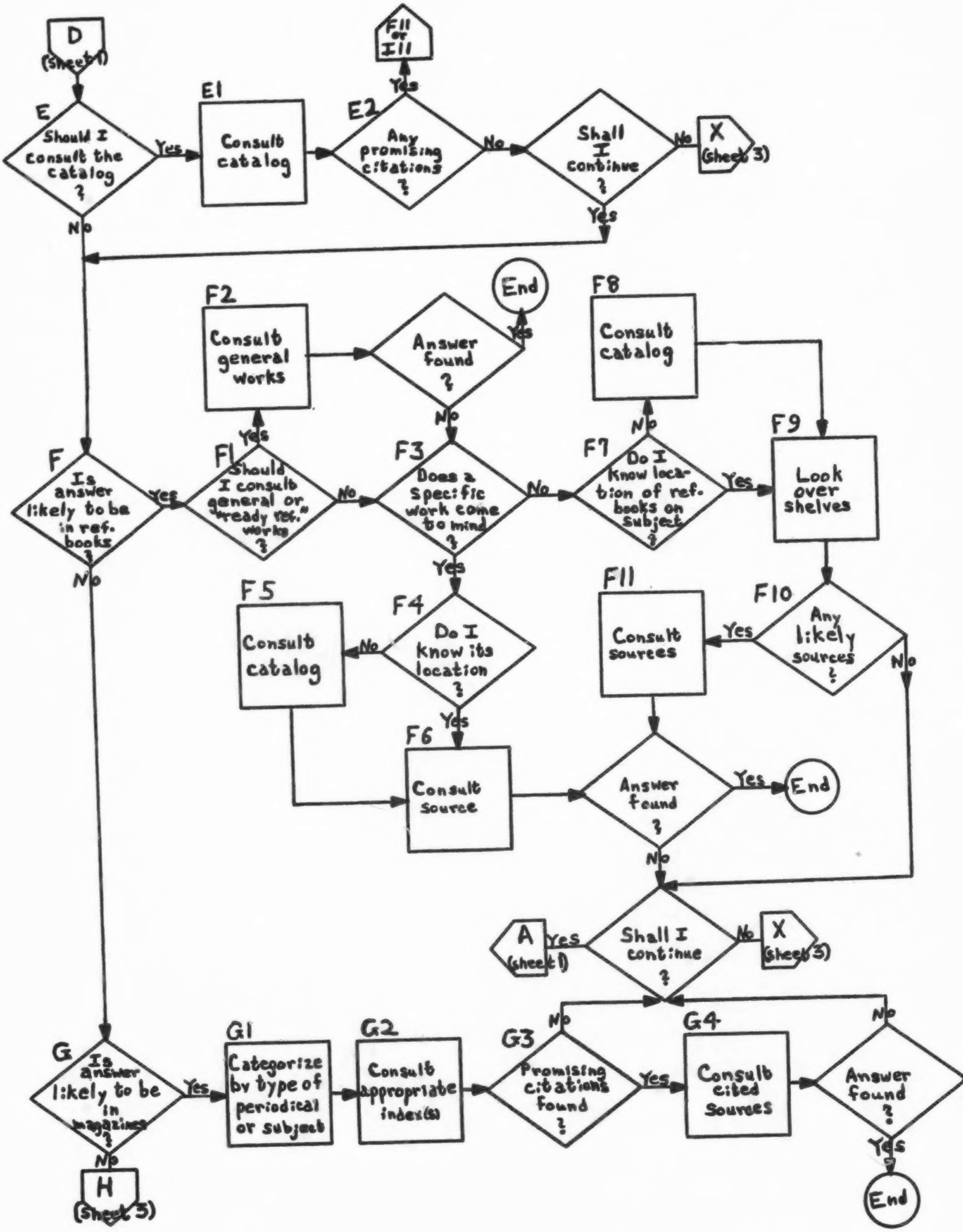
D
(Sheet 1)
E
Should I consult the catalog ?
Yes
No
E1
Consult catalog
E2
Any promising citations ?
Yes
F11 or I11
No
Shall I continue ?
No
X
(Sheet 3)
Yes
F2
Consult general works
Answer found ?
Yes
End
No
F8
Consult catalog
F
Is answer likely to be in ref. books ?
Yes
No
F1
Should I consult general or "ready ref." works ?
Yes
No
F3
Does a specific work come to mind ?
No
Yes
F7
Do I know location of ref. books on subject ?
No
Yes
F9
Look over shelves
F5
Consult catalog
F4
Do I know its location ?
No
Yes
F11
Consult sources
F10
Any likely sources ?
Yes
No
F6
Consult source
Answer found ?
Yes
End
No
A
(sheet 1)
Yes
Shall I continue ?
No
X
(Sheet 3)
G
Is answer likely to be in magazines ?
Yes
No
H
(Sheet 3)
G1
Categorize by type of periodical or subject
G2
Consult appropriate index(s)
G3
Promising citations found ?
No
Yes
G4
Consult cited Sources
Answer found ?
No
Yes
End

FIGURE 1 (Continued) (Sheet 2 of 3)

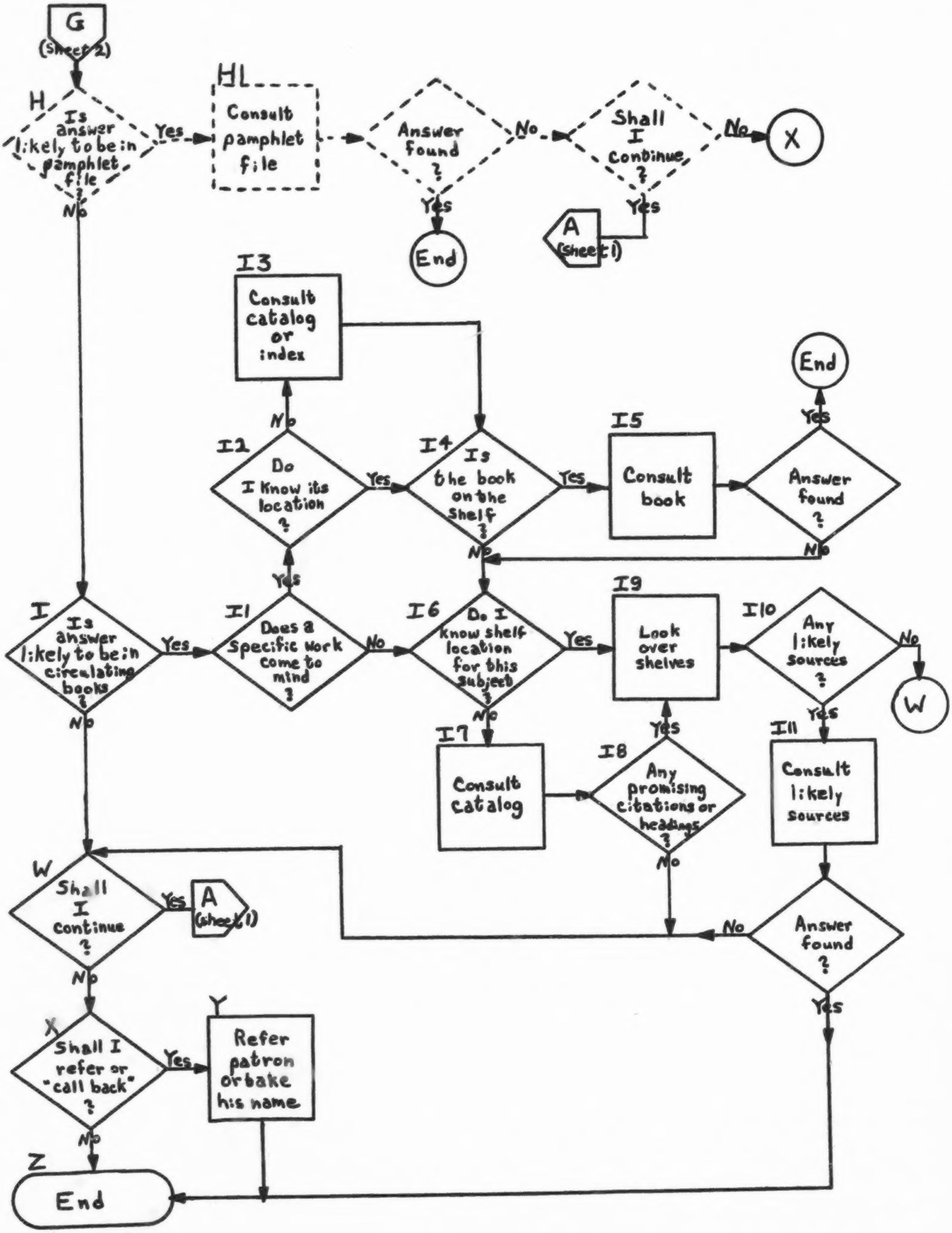
G
(Sheet 2)
H
Is answer likely to be in pamphlet file ?
Yes
No
HL
Consult pamphlet file
Answer found ?
No
Yes
End
Shall I continue ?
No
Yes
X
A
(sheet 1)
I3
Consult catalog or index
I2
Do I know its location ?
No
Yes
I4
Is the book on the shelf ?
Yes
No
I5
Consult book
Answer found ?
Yes
No
End
I
Is answer likely to be in circulating books ?
Yes
No
I1
Does a specific work come to mind ?
No
Yes
I6
Do I know shelf location for this subject ?
Yes
No
I9
Look over shelves
I10
Any likely sources ?
No
Yes
W
I7
Consult catalog
I8
Any promising citations or headings ?
Yes
No
I11
Consult likely sources
Answer found ?
No
Yes
W
Shall I continue ?
Yes
No
A
(sheet 1)
X
Shall I refer or "call back" ?
Yes
No
Y
Refer patron or take his name
Z
End

FIGURE 1 (Continued) (Sheet 3 of 3)

Often, as soon as a question was asked, a possible or probable answering source came to mind, seemingly without any other mental processes being performed. This is what is represented in subroutine B. If this immediate response failed to produce the answer, the participants typically went on with other parts of the procedure. Likewise, sometimes information in the question itself indicated a choice of current periodical information, even before a subject classification had been made. As is shown at C, when this happened the participants followed the subroutine outlined in G1-4.

It will be noted for each subroutine that if it failed to produce an answer, the participant needed to decide whether or not to continue searchings. For a "yes" decision, a return to A is indicated. While continuing a search after unsuccessfully executing a subroutine often involved asking the "patron" for more information, as well as reclassification by subject, in other cases these early decisions were not repeated, and the skip was to another part of the procedure. For a "no" decision to the question of continuing, a skip to X is shown. This indicates that at that point the participant would, in the real reference situation, have decided whether to refer the patron to another staff member, to take his name for contacting with the results of a later search, or to end the search completely. On the test questions the procedure ended here. In most instances of the step labeled "Answer found?" the participant would consult the "patron" as to the suitability of the answer and proceed accordingly, as is usually the case in the actual reference situation.

The box marked D represents a key operation and one that was quite complex. The general or specific subject that was chosen to characterize the question and its eventual answer was usually the most important factor in making the subeequent decisions of the answering process. As well as being important to the initial attempt at finding an answer, reclassification by subject was often central to subsequent new approaches or attempts.

In most instances a type of material, e.g., reference, circulating, magazines, was chosen before the necessity for consulting a catalog or index was considered. However, subroutine E is included to represent those several cases where participants decided first to check the card catalog under the chosen subject to see if the library had any books on the subject and if so, whether they were in the reference or circulating collection.

Having made a subject classification and having failed to find a specific citation from the catalog, if the latter operation was performed, most participants on most questions next considered the reference collection as a potential place in which to find the answer (box F). The decision "yes" or "no" depended on many factors, but mainly on two general considerations.

First, quite often the preliminary decisions pertaining to a question were made while the participant glanced over the ready reference collection or the general reference works such as encyclopedias. The probability that time might be saved by consulting one or more of the sources at hand was used in making decision F. The second consideration was a quick mental assessment of the contents of the appropriate subject section of the reference collection, in relation to the question. Depending on this assessment, the decision at F was "yes" or "no." Of course, in some instances, once a subject categorization was made, a specific reference book came to mind, and the decision at F was automatic.

If the participant decided to consult reference sources and no general source or other specific source came to mind, then typically he went to the appropriate subject section of the reference shelves, with location help from the catalog if needed, to look for potential answering sources. Sometimes seeing a book on the shelves served as a reminder of it as a possibility. More often books were chosen for consultation on the basis of their titles or other characteristics. Sometimes none of the sources were judged worth consulting.

The placement or sequence of decisions G, H, I (and to some extent even F) on the chart was rather arbitrary, since these steps combined represent one of those complex decisions involving several alternatives, which were broken down into components for charting. The decision to pursue the answer to a question in either books, magazines, or pamphlets rested on many judgments concerning both the question and the materials.

While the subroutine for periodicals (G) is fairly simple and straightforward, one common variation should be mentioned. Reference works which are essentially indexes or keys to periodical literature often contain considerable substantive information themselves, in addition to the mere citations to articles. Thus, sometimes the answer to a question can be ascertained without going to the cited articles. This happened so seldom in this study that it was deemed unnecessary to expand subroutine G to account for it.

Subroutine H is shown with broken lines to indicate that the decision to consult pamphlet sources was made at a number of places in the sequence of decisions, from quite early to the last resort, depending on the individual participants. Subroutine I is quite similar to F, outlined above. Here also, sometimes a specific circulating work came to mind upon classification by subject, in which case the participant skipped from D to I2. More often, the participant went to the appropriate shelves of the circulating collection and looked over the titles there. Based on a judgment as to the probability of their producing the answer, one or more books were consulted.

Using this general procedure, the 18 participants each attempted 18 or more of the 29 test questions, for a total of 424 searches. In an attempt to gain more specific information on how the search process was used by the participants, each observation schedule and interview guide was examined, and each procedure step that had been observed or reported was coded, according to the step numbers on the flow chart, and recorded on data sheets. Due to the necessarily brief and informal nature of the interviews concerning the question-answering process, it was difficult to be sure of the accuracy of the information on the unobservable mental processes and decisions. This brought into question the figures for the number of individual steps taken by participants, so that these figures are not reported.

Since it rested more securely on observed behavior, the identification of subroutines resulting from the decisions is considered more accurate and can be reported with more confidence. A surbroutine consisted of the steps that resulted from a "yes" decision at one of the basic decision points represented on the flow chart. For example, each time a participant made a "yes" decision at F, part of the steps numbered F1 to F11 were executed, depending on subsequent decisions. Each such case was tabulated as a use of subroutine F. A "yes" decision at C and the resultant steps were coded as subroutine G, and operation D was included in whichever subroutine immediately followed it.

Table 19 shows the number of times each subroutine was used. One pair of columns shows the number of times each subroutine was performed as the first or only phase of the search, indicating that the decisions at earlier points on the chart were "no" or were skipped. The second pair of columns shows the number of times each subroutine was performed as a second or later phase in a search. Since all pariticpants attempted to answer questions 1-18, figures on the searches for these questions use information from the largest number of searches that are comparable across all participants. Figures based on these 324 searches are reported in this table and throughout the remainder of this chapter. Table 20 shows the number of searches that were composed of specific numbers of subroutines from one to eight. As can be seen a large number of questions required only one subroutine.

While it is interesting to see the relative number of times each subroutine in the general reference procedure was used and the number of subroutines required to answer the test questions, no attempt should be made to generalize the relationship shown here to actual reference work. Although the test questions were made as typical as possible of the factual questions usually asked of medium-sized public libraries, it will be remembered from Chapter II that among the criteria used for choosing specific questions were the probability that the answers would require the use of one or another

TABLE 19

NUMBER OF TIMES EACH SUBROUTINE WAS PERFORMED

Subroutine	As First Step Q. 1-18	 Q. 1-29	As Subsequent Step Q. 1-18	 Q. 1-29	Total Q. 1-18	 Q. 1-29
A	44	58	15	17	59	75
B	50	53	-	-	50	53
E	7	8	9	10	16	18
F	161	226	88	136	249	362
G	8	14	49	57	57	71
H	5	9	8	8	13	17
I	49	56	109	131	158	187
Total	324	424	278	359	602	783

type of material and the expected general difficulty or complexity of the questions.

TABLE 20

NUMBER OF SEARCHES THAT WERE COMPOSED OF SPECIFIED NUMBERS OF SUBROUTINES

Number of Subroutines	Number of Times Required Questions 1-18	 All Questions
1	176	227
2	84	114
3	32	41
4	11	19
5	14	15
6	2	3
7	4	4
8	1	1
Total Subroutines Used	602	783
Average Number Per Search	1.86	1.85

Table 5 in Appendix A shows the number of subroutines required by each participant on each question. Data presented in Table 6 in

Appendix A shows the number of times each participant used each subroutine on questions 1-18, along with totals and percentages for each subroutine. Some relationships and patterns are apparent from these tables, e.g., trained participants tended to use subroutines for reference materials more frequently than untrained. These will be discussed later in this chapter when variations in answering procedures are analyzed.

Variations in Reference Procedure

While it is true that the answering procedures used by all the participants were similar in their general outlines, there were variations that can be related to differences in answering efficiency. In order to bring out these relationships, further abstraction was necessary. The procedure steps were classified into six types, across subroutines: 1) steps for gathering added information in order to aid in seeking answers, 2) steps involving recall of specific tools as potential answering sources, 3) classification or categorization steps, 4) steps involving the use of catalogs and indexes to the library collection, 5) source selection steps, and 6) source use steps. The answering procedures used by each participant on each question, as represented on the observation schedules, were examined closely, and the differences in procedure that were judged crucial to differential efficiency were classified according to the six step types. Each type of answering step will be discussed in turn below, regarding the skills involved in the efficient execution of the step type, its importance to differential efficiency in this study, and participant characteristics related to its efficient execution.

Information gathering steps.--The frequency with which reference questions, as first asked, contain too little information for reference staff members to formulate the execute searches for the answers is one of the problems most often mentioned in reference literature. Steps taken to add to the information contained in the question, in order to conduct a more efficient search for the answer, are those included in this classification. As represented on the flow chart, the steps of subroutine A were included here, as well as the accumulation of additional information as other phases of the search proceeded. The successful execution of this type of step was based on the ability to recognize that added information was necessary to, or might enhance, attempting a search, and on skill in procuring such information, whether from the patron or from materials in the library.

Most of the questions in the test set were fairly straightforward and clear. Thus, the necessity or opportunity for asking or seeking additional information to enhance the search process did not arise often. In those cases where participants needed to seek additional information to answer a question efficiently they did so successfully. While the untrained participants needed to take such steps more often, they were taken quickly and did not cost appreciably in overall answering time. It should be emphasized again that this is only a reflection of the nature of the test questions used. To conclude from these results that the emphasis placed by many reference librarians and teachers on the importance of the so-called reference interview, or the interplay between librarian and patron, is wrong would be to exceed the data provided by this study.

Specific tool response.--This type of step included those instances where a specific tool came to mind as a potential answering source. Steps B3, F6, and I5 from the flow chart were classified here. The basis of success with these steps is difficult to specify, since they involve mainly mental processes almost at the subconscious level. For the participants of this study, success seemed to rest on familiarity with many information sources, as well as on the ability to abstract from questions significant features by which to call specific sources to mind in a sort of stimulus-response fashion.

The causal element of the study hypothesis would predict that the untrained staff member would turn to remembered specific sources more often than the trained librarian; would do so earlier in the answering procedure, i.e., after fewer steps of classification and planning; and would have a lower rate of success with them. To see if this prediction held true, each time a participant reported thinking of a specific source prior to looking over the shelves or consulting a catalog or index on questions 1-18 it was tabulated as a specific tool response and as having been either successful or unsuccessful. The results are shown in Table 21. The number of responses reported on the table are divided between those immediate responses represented on the flow chart by subroutine B and the responses resulting from or following some classification steps. As can be seen, these data do not support the prediction. As a whole, the performance of the trained and untrained participants was quite similar in this area. There were some variations from participant to participant, especially in the net sources successfully consulted. The effect of these variations will be discussed below.

Consulting specific information sources that came to mind took little time and thus seldom slowed the answering process appreciably if a consulted source failed to produce the answer. On the other hand, in many cases successful specific tool responses saved time and increased efficiency. These successful responses were fairly evenly divided between trained and untrained participants and often involved information sources that were prepared by the local library staff. The participants who worked at the reference desk more hours per week seemed to enjoy some advantage in such specific tool responses, perhaps due to more frequent use of the tools.

TABLE 21

NUMBER OF SPECIFIC TOOL RESPONSES
ON QUESTIONS 1-18

	Subroutine B*			After Classification*			Total Used	Net Total
	+	-	Net	+	-	Net		
Trained Participants	23	4	19	47	30	17	104	36
Untrained Participants	21	4	17	46	25	21	96	38
Totals	44	8	36	93	55	38	200	74

*+ = Successful; - = Unsuccessful

Classification steps: by subject.--The procedure steps designated as classification steps were those involving decisions as to what subject areas the question and its eventual answering sources might fall into and what kinds of library materials (i.e., reference books, circulating books, magazines, or pamphlets) were most likely to produce the answer quickly. For purposes of reporting findings, this group of steps was divided into two subgroups, those steps involving classification by subject and those involving classification by type of material to be consulted.

The classification of a question by subject was a very important and complex step in the search procedures. In general, what seems to have been most important to success here was not only the ability to use the terms of the question, plus additional information if and when sought, to make an initial subject classification, but also the ability to use clues from the reference system (e.g., cross references in indexes or catalogs, or statements in consulted works that failed to provide a complete answer) to broaden, narrow, or change the subject as the search proceeded. For the 324 searches on questions 1-18, some 370 subject classifications or reclassifications were reported or inferred from observations. Excluding some 40 searches where the immediate response was to select a specific book prior to subject classification, this amounted to about 1 1/3 subjects tried per search. The trained participants as a group used a few more subjects than did the untrained.

Classification by subject was among the most important step types in accounting for differential efficiency. Around 20 percent of the crucial procedure differences were classified here. The untrained participants had considerably more trouble with subject classification than did the trained. The main difficulty for the untrained staff members was the use of subjects that were too broad or general, e.g., "biology" for question number 3 (life span of the Red Squirrel), rather than the more narrow and useful "wild animals" or "mammals." This suggests that such matters in library school courses as the emphasis on close subject classification and the principle of specific subject headings gave the trained participants an advantage in this area.

Particularly successful subject classification of questions, contributing to high efficiency, seemed to be closely related to what might be called familiarity with the library collection. Close familiarity with the collection seemed to provide both a wider set of alternative subjects and the knowledge needed to choose quickly and correctly among them. This was indicated by the fact that in the majority of instances, where subject classification difficulty was identified, the participants used one classification too long, perhaps for the lack of alternative subjects, gave up on questions without trying alternate subjects, or consciously rejected a potential subject because of a misjudgment of the contents of the library's collection in that subject.

Classification steps: by type of material.--Decisions as to what type of material to consult were also very important to efficiency in answering the test questions. From the discussion of subject classification above, it can be noted that the relation between classification by subject and classification by type of material was not related in as simple and sequential a manner as the flow chart would indicate. Often these two processes were performed in one complex operation, with subject classification utilizing assessments of appropriate sections of various types of materials and the choice of a material type resting on the subject finally selected for priority. Success in choosing a type of material seemed to rest on the ability quickly and accurately to judge the contents of the various collections of types of material in relation to such characteristics of the question as subject, recency of information needed, approximate level of detail or specialization called for, etc. Within the general categories, more specialized type classifications were often made (e.g., field guide or handbook) necessitating an ability to judge the contents of these also.

Classification by type of material was also very important to differential efficiency, again accouting for around 20 percent of the crucial procedure differences. Trained participants had fewer differences that were judged to have caused low efficiency and more that contributed to high efficiency than did untrained. In most cases of difficulty due to classification by type of material the untrained participant rejected reference materials on the basis of a misjudgment of the contents of the reference collection in the subject field involved. For example, on the question concerning the Red Squirrel an untrained participant might have said, "I don't believe any of our reference books on animals would contain such information," while a trained participant would say, "I believe a field guide on animals in the reference collection would contain such information." Untrained participants also tended to continue searching unsuccessfully in one type of material longer than did the trained staff members, to the detriment of efficiency, perhaps from a lack of alterantives thought of or judged feasible.

Particularly efficient type-of-material categorizations were often credited by the participants to regularly performed processing duties with the type of material involved. Along this line, it is interesting to note that eleven of the thirteen uses made of pamphlets on questions 1-18 were by participants who were or had been responsible for processing pamphlet materials.

Many cases of differences in classification by type of material were judged to be due to peculiarities of the libraries involved. For example, in one library a substantial part of the circulating collection was shelved on the floor above that containing the reference desk and collection. The participants in this library chose to consult circulating materials at the shelves in these subject areas less often than did those at other libraries, sometimes hampering efficiency,

Catalog or index use steps.--The ability to use the bibliographic and indexing apparatus of a library collection is considered to be among the most important skills of the reference librarian by most reference practitioners and teachers. Due to the relative simplicity of the test questions and the heavy reliance by all participants on memory of the shelf locations for various subjects and choice from among the tools found on the shelves, catalog and index use assumed somewhat less importance in this study than might have been expected. Success in such use for the study participants depended on the ability to translate the terms of the question or the subject classification thought of into the formal language of the catalog or index consulted. Also important were the readiness and ability to use cross references and to use the various pieces of information on a catalog card or in a citation to decide quickly and accurately if the cited source might answer the question.

The rationale on which the causal element of the study hypothesis was based would suggest that the trained participants would make greater use of the bibliographic equipment of the library in order to identify sources for answers to the questions. Data from this study did not support this expectation. The 18 participants consulted the card catalog 103 times on the first 18 questions. Of these 103 uses of the catalog, 43 were by trained and 60 by untrained participants. Within each group, the uses were fairly evenly spread, except that participants in the library mentioned in the section above used the catalog more often, to compensate for the inconvenience of using shelf location for those materials shelved at a distance. Periodical index use constituted almost all of the index use, of which there were 26 instances by trained participants and 35 by untrained. This latter might be expected, since untrained staff members tended to use periodicals more than trained.

Differences in use of the card catalog and indexes were judged to have caused differential efficiency in about 10 percent of the cases. Such differences in procedure were fairly evenly divided between trained and untrained participants. Use of the card catalog caused the untrained participants the most trouble. They had difficulty translating the terms of the questions into the headings of the catalog and in using cross references. The trained participants' troubles were more in the area of index use and took the form of difficulty in arriving at the appropriate index terms to use and lack of thoroughness.

Source selection.--In those cases where immediate responses or classification decisions did not bring to mind specific sources to be consulted, potential answering sources had to be chosen from among those on the reference or circulating shelves examined. Efficiency in this type of step seemed to rest on the ability to distinguish between similar sources on the basis of outward characteristics, such as title, or to remember past usefulness of a source upon seeing it on the shelf.

Included in this category of steps was the decision to consult a general source or sources, such as an encyclopedia or almanac, since this decision was often or usually made while glancing over the general or ready reference section of the reference collection. Thus, to an extent, the decision to consult such sources was a matter of selecting one source from several seen. Since the fact that these decisions had been made was largely inferred from observed behavior, and since the sources involved were quite familiar to the participants, classification was rather arbitrary, and some of the decisions to consult general sources might have appropriately been included among specific tool responses or type-of-material classifications. At least, a close relationship exists among these three types of steps.

For the first 18 questions the participants decided to consult general sources 55 different times. Of these 55 decisions, 26 were by trained and 29 by untrained participants. For both groups of staff members nine such decisions produced correct answers, and the remainder failed to do so. The decision to consult a general source was ostensibly taken in an attempt to same time. That is, a participant would often say something like, "While we are here, let's check the almanacs." However, the investigator often felt that the general work was being consulted while the participant attempted to think of the best subject and type of material approach to use, a device suggested in some reference texts. Thus, the choice of a general reference tool was perhaps based on a combination of a judgment of the probability of that source's containing the answer and the immediate perception of other possible approaches. Consulting general sources seemed to work somewhat more to the advantage of the trained participants, perhaps as a result of a more accurate assessment of the contents of sources, to be mentioned again below, and as a result of more facility in subject and type-of-material classification, as mentioned in previous sections.

The remaining steps classified as source selection included those steps where a source (other than a general source) not previously thought of was selected from a shelf for consultation. This excludes those instances classified as specific tool responses. Out of 324 searches by the 18 participants on questions 1-18, 171 searches involved such selection. For these, some 364 separate sources were chosen and consulted, 176 by trained and 188 by untrained participants. Of these, 53 (43 percent) of the choices by trained participants produced correct answers, as opposed to 59 (46 percent) for the untrained.

Source selection differences were judged to have contributed to between 15 and 20 percent of the cases of differential efficiency. Such cases were evenly divided between trained and untrained participants and seemed to lack any other pattern that could be related to independent variables. Two participants who showed considerable difference in their choice of answering sources, sometimes to the detriment of efficiency, worked in a library where space shortage had forced the removal of some materials from the regular shelves for shelving in less accessible areas.

Source use.--Having remembered or chosen a tool as a potential source for the answer to a question, the ability to find the answer in it or to decide that the answer was not there was important to the efficiency of the study participants. Success at this point seems to have been based on the readiness to use and skill in exploiting the explanatory and other auxiliary sections in unfamiliar tools, the use of techniques to increase speed in getting at the information needed, and thoroughness.

The efficiency with which chosen sources were used was judged to have been the contributing factor in some 20 percent of the instances of differential efficiency. The untrained participants had much more difficulty in source use than did the trained.

Three major types of use difficulty were noted among the instances of low efficiency between members of pairs due to source use. The chief of these was the failure to use the table of contents, "how to use," and other auxiliary sections of an unfamiliar or complicated work to aid in it use. Often both members of a pair selected the same source and both were unfamiliar with the arrangement of sections and placement of information needed, e.g., the manufacturers' and advertisers' directories used to answer question number eleven. While the more successful member of the pair used the auxiliary material to help locate the needed information quickly, the other participant attempted the more direct approach of leafing through the volume, failed to find the needed information quickly, and sometimes incorrectly decided it was not there.

A second difficulty involved failure to use techniques to increase the speed of the use of information sources. Some of these are in the nature of "tricks of the trade." For example, a helpful device used by several participants was always to start with the last bound volume when using a cumulated reference set for recent information, before taking the time to consult each smaller unbound issue. Failure to use this technique cost some untrained participants time, as did failure to use the general indexes to encyclopedias in some cases.

Finally, there was the lack of thoroughness, e.g., the use of one index entry when taking the time to see and use another farther down the page would have been more helpful, or the use of a table without reading the heading or explanatory text carefully.

Two further points need to be made. The two trained participants who had their training from unaccredited school library program showed source use patterns more similar to the untrained participants than to the other trained participants. These staff members reported having studied a fairly restricted range of types of materials in their reference courses and little or no emphasis on techniques for their use in reference work. Even though some of the tools which the other trained participants used more successfully were reported not to have been studied in library school, there seems to have been some generalized effect on source use from studying a broad range of types of information sources.

Also, it will be remembered from Chapter II (pages 36 and 37) that larger differences in efficiency between members of pairs tended to be associated with smaller library collection sizes. Analysis of differences in answering procedure across pairs indicated that much of the crucial difference was in the area of source use. In the larger collection, when a participant made a subject classification of a question, the shelf consulted often had one or several useful specialized sources in which to find the answer. In the smaller collections greater use had to be made of more general sources, demanding more skill in selecting appropriate general tools, perhaps based on more thorough knowledge of their contents, and greater ability to get at the information in them through indexes, etc. Crucial differences in procedure due to source use were more prevalent among participants in smaller libraries.

Summary

This chapter represents an attempt to present information on the nature of the relationships betwen the independent variables and reference performance by examining the answering procedure used by the participants. Contrary to the prediction of the causal factor of the hypothesis, the trained and untrained participants were found to have used the same general type of procedure. This procedure was composed of a series of several basic and complex decisions, out of which grew various operations or subroutines, depending on the decisions reached. The difference between the more efficienct and less efficient participants, then, was not to be found in the general search procedure used, but rather in the usefulness of the decisions reached at various points in the procedure and the skill in performing the operations called for by the decisions.

In order to analyze differences in procedure seriously affecting performance efficiency, the many steps of the general search procedure were classified into eight basic step types and sub-types including both decisions and operations: 1) information gathering steps, 2) specific tool responses, 3) classification by subject, 4) classification by type of material, 5) catalog or index use, 6) source selection from among general reference tools, 7) source selection at the shelves, and 8) source use.

Classification by subject, classification by type of material, and source use were found to be the types most frequently associated with differences in search procedures that resulted in differential efficiency. For each of these step types, variation in successful execution was most closely related to variations in professional education, among the independent variables discussed in Chapter II. That is, professionally trained members of pairs had fewer crucial search differences associated with high efficiency than did untrained members of the same pairs. Indications of relationships between other independent variables and efficiency were found. Time spent per week actually answering reference questions seemed to increase success in remembering specific tools as answering sources, particularly those prepared by the library staff. Non-question-answering duties regularly performed were noted to be related to success on classification steps, particularly classification by type of material to be consulted.

Other independent variables were related to procedure, and thus to efficiency. Variations in the libraries in which the participants worked were related to crucial differences in several step types. There were indications that small collection size increased opportunity for the close familiarity with the collection that enhanced classification by subject and type of material. In the two libraries with some materials shelved at a distance from the reference desk or shelved out of normal sequence, type-of-material classification and source selection was affected. The size of the collection seemed to make differential demands on skill in source selection and use, thereby affecting differences in efficiency between trained and untrained members of pairs.

Conclusions that can be drawn from these findings, as well as the practical implications for reference service, will be discussed in the following chapter.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The purpose of this study has been to gather and examine data on the relationship between formal library education and effectiveness in answering reference questions, as well as to gain some empirical information on the operation of other variables in the reference situation. The method employed to do this was a series of field studies in which nine pairs of reference staff members in medium-sized public libraries were asked a set of test reference questions and observed carefully while they attempted to find answers to them. The members of each pair were as similar as possible with regard to such variables as amount of undergraduate education and years of reference experience, while differing in amount of formal library training.

The data collected was used to test not only the study hypothesis that the trained librarians would be able to answer significantly more questions and would do so more rapidly, but also some alternative hypotheses that might have explained the differences in performance found. In addition, the effect of other variables that were found to be operative in the reference situation were discussed. Finally, in an effort to specify in more detail the nature of the relationships found to exist, variations in the procedures used by the study participants to find the answers to the test questions were examined. The balance of this chapter will summarize the findings of the study, specify some of its limitations and assumptions, outline some conclusions that can be drawn from the findings, discuss some practical implications of the findings and conclusions, and suggest some directions for further research.

Summary of the Findings

1. The ratio of questions answered correctly to all those attempted, used as an indication of the participants' accuracy, was not significantly different between trained and untrained participants.
2. Trained participants took significantly less time per question attempted than did untrained participants.

3. When speed and accuracy were combined to yield a figure for the time required per correct answer for each participant, used as an indication of performance efficiency, the trained participants were found to have performed significantly more efficiently than the untrained. Differences ranged from 1.02 minutes per correct answer in favor of the untrained member of a pair to 3.24 minutes per correct answer in favor of the trained member of another pair, with a mean difference of 1.23 minutes in favor of the trained participants.

4. When the age of the participants was used as a alternative independent variable to relate to the differences in efficiency between members of pairs, the results were not statistically significant, thus weakening the credibility of one alternatice hypothesis.

5. The number of years that had elapsed since the end of the participants' formal education was also used as the independent variable in an alternative hypothesis. No significant results to challenge the study hypothesis were found.

6. When the relative amount of responsibility for the selection and handling of reference books was related to efficiency, a significant relationship was found. While this alternative hypothesis could not be destroyed, it did not account for the differences in enough pairs to supplant the study hypothesis.

7. The number of hours per week spent answering reference questions was also advanced as an alternative independent variable. Some apparent positive relationship between hours assigned to the reference desk and efficiency was noted. The fact that some crucial differences in answering procedure were associated with this variable strengthened the credibility of this alternative hypothesis, though again not enough of the difference was explained thereby to justify rejecting the study hypothesis.

8. Attention was also given to the relationship between several variables and the size of the advantage in efficiency had by the trained members of the pairs. The variable most strongly related to the size of difference in efficiency was the amount of difference in responsibility for selecting and handling new reference books. The wider the difference in such duties between the members of the pairs (in the direction of the trained members' having more duties), the larger was the trained members' advantage in efficiency over their counterparts. The rank order correlation coefficient between these two variables was .767. When differences in answering procedure related to differential efficiency were studied, these duties, as well as other regularly performed duties connected with information materials, were found to be associated with success in specific tool responses, classification by subject, and classification by type of material to be consulted.

9. A rank order correlation coefficient of -.642 was found between the amount of in-service training and direct professional supervision reported by each untrained participant and the size of the difference in efficiency between that participant and the trained counterpart.

10. A decrease in the size of the adult collections with which the pairs worked was correlated with an increase in the amount of advantage in efficiency the trained participants had over the untrained. The rank order correlation coefficient here was -.533. Findings from the study of the answering procedures used by the participants indicated that this relationship was due to increased demands made by the smaller collections on the source use skills of the participants. Other differences from library to library were found to affect efficiency, particularly by affecting type-of-material classification and answering source selection.

11. Not enough difference in the formal reference education the trained participants had received existed to relate this variable to efficiency meaningfully. The two participants with degrees from unaccredited programs were at some apparent disadvantage in efficiency, and this was confirmed by the study of reference procedure. However, the differences were not clear-cut enough to judge their significance.

12. The basic or general procedure used in searching for answers to the test questions was found not to be essentially different for trained and untrained participants. For both it consisted of a series of more or less ad hoc decisions, as opposed to planned strategy, and operations resulting from the decisions. Differences in answering efficiency were due to differences in the appropriateness of the decisions reached and the skill with which the operations decided upon were executed.

13. Of the 191 books or sources, excluding magazines, in which the trained participants found answers to all the questions attempted, 28 percent were published after the participants using the sources finished library school. Another 25 percent would not have been studied in reference courses because they were circulating materials of types not considered in reference and bibliography courses, at least not by title. Finally, for many of the remaining 47 percent the participants reported not having studied them in library school courses, or could not remember whether or not they had studied them.

14. Differences in classification by subject, classification by type of material to be consulted, and source use were the most important types of procedure differences associated with differential efficiency. Each of these accounted for some 20 percent of the total differences in procedure judged crucial to efficiency.

Limitations and Assumptions

Any conclusions or generalizations based on the findings summarized above should be drawn only after the limitations and assumptions implicit in the design and method of this study have been made explicit. Those that are most important are outlined below.

1. The libraries in which the participants worked were all public libraries, and the test questions used were drawn from public libraries. Findings would be applicable to other types of libraries only to the extent that their reference situation are similar to

those of public libraries, a point on which little objective information is available.

2. The reference situations studied were all in medium-sized central libraries. No very small or very large libraries were studied, nor were any branch library operations included.

3. Only general reference departments were studied. The applicability of the findings to subject departmentalized reference systems is, therefore, unknown.

4. Only a small number of cases were studied, and these were not randomly selected or claimed to be systematically representative of any wider population. There is no reason, however, to believe that the libraries or participants studied were atypical of medium-sized public libraries.

5. The test questions asked for factual, not interpretative or judgmental, information. While this type of question has been found to comprise the major part of the day-to-day work of a reference department,[1] findings based on the test questions do not allow generalization to all types of reference questions.

6. Any generalization from the nine participants with fifth-year library degrees to support a hypothesis concerning "trained" librarians rests on the assumption that reference education has been similar for all or most trained librarians, including all those studied. As pointed out in Chapter II and on Table 15, page 35, the reference training received by the participants was fairly similar. In addition, the participants represented a fair cross section of library schools, having attended two different unaccredited schools and five different accredited schools. The literature of reference instruction also indicated a considerable similarity among the training agencies.[2]

Conclusions

Within the limitations above, some conclusions can be drawn.

1. The study hypothesis, which predicts that professionally trained librarians will be able to answer a larger proportion of information requests and will do so in less time than will untrained staff members, is supported by the data from this study. The predicted differences were found to exist among the participants, and reasonable alternative explanations for the differences were found not to be as tenable as the study hypothesis.

2. The contention by some that professionally trained staff members will be more thorough and cognizant of the currency and accuracy of the factual information they give in answer to questions finds little or no support in this study. On the questions where the most opportunity for this distinction arose, both trained and untrained participants showed a tendency to accept the first answer found in print, and the difference in their accuracy was not significant.

3. The significant differences were on the variable of answering speed. Even here the differences were not great. However,

a reference librarian's day is made up of many questions, each occupying a small segment of time. A small difference of each question can add up to a large difference over the course of a day. Even one added minute per question can be a considerable time to a patron who must wait through several other questions before his own is answered.

4. To the above limited extent, then, the reference staffing principle, noted in Chapter I, that only trained librarians should be assigned to answering reference questions, is supported by the findings of this study.

5. On the other hand, findings of the study also show that staff members lacking formal library education can answer accurately and quickly a wide range of factual refernece questions and can, under some circumstances, perform as efficiently as professionally trained librarians, or even more so.

6. The factors that were most strongly associated with the smallest differences in favor of trained members of pairs, or with differences in favor of the untrained members, all involved mechanisms that allowed increased familiarity with the information contents of the library collections--in-service training, responsibilities for the selection and handling of reference books, and other duties having to do with materials used in reference work. These factors also are indicative of close integration of untrained staff members into the day-to-day operations of the reference departments, over and above merely manning the desk and answering questions.

7. The knowledge on which increased efficiency in answering questions was based might be generally characterized as familiarity with the library collection. However, only a small proportion of the instances of higher efficiency were based on direct memory access to specific sources or titles and their contents. Rather, the important familiarity was in terms of knowledge of the subject classification mechanisms of the library, the relationships between the contents of various types of materials, the formal language of the catalog and indexes to the collection, in addition to a generalized skill in the use of information sources.

Practical Implications

The findings and conclusions of this study have implications to library administration and education, some of which are outlined below.

1. As one partial answer to the shortage of professionally trained librarians, reference administrators should consider mechanisms for assigning untrained staff members responsibilities for answering at least factual reference questions. Such considerations would have to take into account the potential increased cost in time per question indicated by the findings of this study,

as well as other factors on which there is a lack of objective information.

2. The opportunities for learning about reference materials and reference skills, both from formal in-service training and from the supervised performance of relevant duties should be made amply available to untrained staff members responsible for answering reference questions.

3. A balance between amount of time assigned to answering reference questions and amount of time assigned to other regular reference-related duties should be maintained. Both seem to make important contributions to answering efficiency. Also, the fact that untrained staff members who were more closely involved in a variety of the day-to-day operations of the reference departments performed more efficiently might illustrate the standard administrative principle that the staff member who feels that he is a contributing and vital member of a team is likely to be more productive.[3]

4. Since a large portion of reference work is done under the pressure of time, or under "rush hour" conditions, the principles of "least effort" and "least time," found to be very operative on the test questions, are undoubtedly a significant element in practical reference work. For this reason, it is important that time and effort saving devices, such as the ready reference collection and special arrangements of the reference collection, be designed to contribute to accuracy and authority of answers, as well as to the speed with they may be found. Otherwise, the desire to save time for the patron can come into conflict with the pursuit of the best answer to his question. For example, some libraries among those studied kept the standard general almanacs and Statistical Abstract at the reference desk near the telephone, while others omitted the latter. Participants at the libraries with only the almanacs at the desk used them more often and Statistical Abstract less often, sometimes to the detriment of the completeness or currency of the answers given.

5. The fact that shelf classification and shelf location were relied upon heavily in reference work is an argument for the consistency and integrity of the classification of books in a library. This means also that definite policies with regard to what types of material are put into the reference collection and what types into the circulating collection should be made and followed. When major changes in classification designations for subjects need to be made, the reference staff should be made cognizant to them.

6. Other decisions regarding the physical arrangement of libraries and library materials should take into account possible effects on reference efficiency. This is not to say that such considerations should outweigh considerations of patron convenience or reading encouragement by easy access, but the probable costs as well as potential advantages should be used in making such decisions.

7. Implications of this study for library education are particularly hard to specify. If it is the case that skill in answering factual reference questions can be adequately learned on the job, perhaps library school reference courses should deemphasize teaching these skills and concentrate on preparing librarians to administer reference departments for efficient service, to train and supervise reference assistants, and to answer more difficult types of questions.

8. The importance in this study of the appropriate categorization of questions with regard to subject and type of material, and the fact that direct memory access to tools studied in library school was much less important to differential efficiency, would indicate that even courses emphasizing skill in answering questions should teach more than detailed knowledge of the contents and use of specific reference tools. What the trained participants seem to have brought from library school, and what some of the more efficient untrained participants had been able to learn on the job, was an understanding of relationships and operations within the information contents of the library--relationships between general and specific subject classifications and subject terms and operations for moving among them, relationships between the types of information contained in different types of material and operations for getting to the information needed, relationships between various auxiliary and substantive sections of complex reference tools and operations for coordinating them.

This is not to say that working knowledge of many basic and specialized sources was useless to the participanss of this study. Perhaps the practice of reference is somewhat analogous to the use of language. The knowledge of a large number of reference sources would compare to the possession of a large vocabulary; each is necessary to skill. However, articulate use of a language requires the effective command, whether conscious or not, of the rules of grammer and skill in their application. Likewise, it might be argued, effective practice of reference librarianship requires knowledge of what has been called the "principles and operating characteristics of the bibliographic system."[4] The process of finding the correct answer to a reference question has been characterized as traversing the world of published writing to the point where the desired information is presented in the form and style needed by the patron.[5] This study indicates that general knowledge of the world to be traversed is at least as important as specific knowledge of the points to be reached.

Suggestions for Further Research

More information on reference personnel should be pursued on a number of fronts, desirably in a coordinated fashion. Below are some ideas for replicating the present study and extending similar research into other types of reference situations, as well as some suggestions for research into other related areas.

The present study should be considered exploratory or preliminary. Before its findings and conclusions can be accepted with real confidence, other studies along similar lines should be done to validate, supplement, or contradict it. Some needed refinements and improvements are evident. Most obvious is the need for more adequate control of the several variables studied. For example, conclusions as to the relationships between performance and such variables as in-service training, non-question-answering duties, age, experience, and size of collection had to be very tentative because the proposed independent variables themselves were related to each other, and their individual effects could not be separated.

Perhaps the eariest way to improve control on some of the variables would be to get information concerning them in advance of selecting the participants, so that differences on these variables can be taken into account in matching and choosing participants. Attempting to match on too many variables would probably not be feasible, but if, for example, information on in-service training is known in advance, the investigator can avoid having a group of cases where amount of in-service training varies with amount of experience. In any case, attention to more variables prior to selection would probably necessitate surveying a larger group of libraries for potential participants than those found in the the four-state area used in this study. Likewise, using information from this study concerning factors of library arrangement and set-up that affected reference efficiency, an investigator could construct indexes for scoring libraries and attempt to relate more precisely to performance other interlibrary differences besides collection size.

Using the present study and considerably more preliminary study as a basis, research of more sophistocated design should be conducted so that variables could be controlled statistically, through such techniques as partial correlation. Random sampling should be used to choose participants. More precise measurement of the variables than rankings should be developed, since at least an interval scale level of measurement is required for such statistical manipulations. This would necessitate more rigorous definitions of some of the variables, as well as more attention to the reliability and validity of the measures.

Research on the differential ability of trained and untrained staff members to answer reference questions should be extended into different areas from those considered in this study. One might ask if the same or similar relationships hold for other types of questions. Other test sets of questions could be constructed, using questions that are more difficult to find answers for and questions asking for interpretative or judgmental information, wherein the librarian has to help the patron find and evaluate information on broader more open-ended questions. If it is found that untrained staff members, given appropriate on-the-job training and experience, can answer certain kinds of questions but not others, the next logical question is whether or not they can recognize the difference soon enough to avoid wasting time by attempting inappropriate questions. Some administrators hesitate to use untrained personnel to answer questions not because they feel that there are no questions that such persons can answer, but because of a fear that untrained staff members will not have sufficient judgment to know when they are out of their depth or when to refer a question to another staff member. The validity of this fear needs to be tested.

Other sizes of libraries need to be studied, particularly very large ones. The same kind of study could be conducted in very large general reference departments with a great many specialized reference tools and with circulating collections spread over several floors and probably in several subject departments. Results would quite possible be considerably different from those of the present study. Other types of libraries should also be studied. Reference staffing problems are no less severe in academic libraries than in public libraries, and yet academic libraries might be able to tap a ready supply of untrained reference assistants in college-educated student and faculty wives, as well as advanced students. Research studies need to be designed and executed, comparing the ability of subject specialists lacking library education and trained librarians with little subject background to do reference work in subject areas.

In addition to replicating the present study, with improvements, and extending it to different reference situations, other areas are much in need of attention before the findings of studies like this one can be put to the best use. If it is true that at least some staff members lacking formal library education can answer reference questions quickly and accurately, how can this fact be put to the best use of the library? Management research needs to be done on procedures and techniques for screening questions and directing them to appropriately trained staff members or for smooth referral of questions among staff members. This is a difficult problem, involving patron comfort and public relations, which is one of the factors underlying the staffing principle examined in this study. The lack of a solution for it will stand in the way of the applications of findings from studies such as the present one.

Also in need of attention are the in-service training and on-the-job experiences that can enable the untrained staff member to perform efficiently on reference questions. Only the most meager of information on this problem could be offered in this study. Successful programs in operation should be examined and described, and feasible ideas experimented with. Also, features of local reference system arrangement and procedures that are most closely related to performance efficiency should be identified. Finally, the background and personality characteristics of untrained reference staff members that are related to reference performance should be identified. Particularly interesting might be the attitudes of the staff members toward finding answers to questions. For example, staff members who emphasize reader advisory work and the pleasures of reading might well consider much emphasis on efficiency inappropriate to books and their use.

The implications drawn above with regard to formal library education for reference work are very much open to question and research. Even if the information and concepts to be conveyed are of a more general nature than details about specific sources and their uses, the best method for doing this might still be the rather inductive one of using a great many examples of specific information sources, from which the characteristics of the bibliographic system can be generalized. Carefully controlled experimentation with different methods of education for reference work should be carried out, as well as the examination and application of relevant research information from other disciplines. Research information about the knowledge and skills necessary to the practice of librarianship cannot be made useful until the means of conveying them to librarians are discovered.

Finally and perhaps most important, there is need for a program of research into the operating characteristics of the system which has been evolved by society to communicate and store the information that is always the object of reference questions. Even the limited findings of the present study indicate confirmation of the following statement by Freides:

> The really important knowledge demanded of the reference librarian is knowledge of relationships and patterns within a system: the characteristics of the universe of publication, the way in which the tools of our trade--the handbooks, bibliographies, and so forth--reflect this universe, and the quantity and quality of distortion produced by the reflection; the way in which the contents of the writings are encapsulated and codified in indexes and catalogs, and the amount and kind of seepage taking place thereby; the relationship between basic research and summary, between scholarship and popularization, and the meaning of all these in terms of the reference inquiry.[6]

However, as Freides goes on to say, "many of the components of this system are as yet unknown and many more are unarticulated." Careful and continuing research in this area might well be requisite to understanding reference librarianship and staffing for its effective service.

Footnotes to Chapter IV

[1] Samuel Rothestein, "The Measurement and Evaluation of Reference Service," Library Trends, XII (January, 1964), 456-72.

[2] Louis Shores, "We Who Teach Reference," Journal of Education for Librarianship, V (Spring, 1965), 238-47.

[3] Joseph Wheeler and Herbert Goldhor, Practical Administration of Public Libraries (New York: Harper and Row, 1962), p. 235.

[4] Thelma Freides, "Will the Real Reference Problem Please Stand Up?" Library Journal, XCI (April 15, 1966), 2208-12.

[5] Ibid.; see also Mary N. Barton and Ellen F. Watson, General Reference Staff Manual (Baltimore: Enoch Pratt Free Library, 1950).

[6] Freides, loc. cit.

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APPENDIX A

DATA TABLES

TABLE 1

SUCCESS ON EACH QUESTION BY PARTICIPANTS

	Participant									
Question	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
1	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X
3	X	0	0	0	X	X	0	X	0	X
4	X	X	X	0	0	X	X	X	X	0
5	X	0	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X
7	X	0	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X	X	X
10	0	X	X	X	X	X	X	X	0	0
11	X	0	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X
13	X	X	0	X	X	0	0	X	X	X
14	X	X	X	X	X	X	X	X	X	X
15	X	X	X	X	X	X	X	0	X	X
16	X	X	X	X	X	X	X	X	X	0
17	X	X	X	X	X	X	X	X	X	X
18	0	X	0	0	X	0	X	X	0	0
19	X	X	X	X	X	0	X	X	X	-
20	X	-	X	X	X	X	X	X	X	-
21	-	-	X	X	X	X	X	X	X	-
22	-	-	X	-	X	X	X	X	X	-
23	-	-	-	-	X	X	X	X	X	-
24	-	-	-	-	X	X	X	X	X	-
25	-	-	-	-	X	X	-	X	X	-
26	-	-	-	-	X	X	-	X	X	-
27	-	-	-	-	X	X	-	0	X	-
28	-	-	-	-	X	X	-	-	-	-
29	-	-	-	-	X	X	-	-	-	-

Note:

X = Answered Correctly
0 = Attempted but Not Answered Correctly
- = Not Attempted

TABLE 1 (Continued)

	Participant							
Question	F1	F2	G1	G2	H1	H2	I1	I2
1	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X
3	O	X	X	X	X	X	X	O
4	X	X	X	X	X	X	X	X
5	X	X	O	X	X	X	O	O
6	X	X	X	X	X	X	X	O
7	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X
10	O	X	X	X	X	X	O	O
11	X	X	X	O	X	X	X	O
12	X	X	X	X	X	X	X	X
13	X	X	X	X	X	X	O	O
14	X	X	X	X	X	X	X	X
15	X	X	X	X	X	O	X	X
16	X	X	X	X	X	X	X	X
17	X	X	X	X	X	X	X	X
18	O	O	X	X	X	X	X	X
19	X	X	X	X	O	-	X	X
20	X	X	X	X	X	-	X	X
21	X	X	X	-	X	-	-	O
22	X	X	X	-	X	-	-	X
23	X	X	X	-	X	-	-	-
24	X	X	X	-	X	-	-	-
25	X	X	X	-	X	-	-	-
26	X	X	X	-	X	-	-	-
27	X	O	X	-	X	-	-	-
28	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-

TABLE 2

MINUTES REQUIRED ON EACH QUESTION BY PARTICIPANTS

	Participant									
Question	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
1	2.0	4.2	1.5	3.2	3.2	5.6	2.0	1.2	.5	1.8
2	1.0	1.2	2.7	1.8	2.8	8.7	.8	.8	2.7	1.0
3	10.0	15.0	9.3	9.2	2.5	4.8	12.8	3.7	7.3	12.2
4	2.1	4.3	2.0	4.3	3.4	3.5	5.2	4.0	2.8	3.2
5	8.9	15.0	4.2	5.7	3.5	3.5	2.2	7.1	1.2	14.8
6	5.0	3.9	1.8	6.8	5.4	3.9	6.3	6.2	8.0	8.8
7	1.8	6.4	2.1	1o.5	1.6	5.1	1.6	2.2	3.0	14.8
8	.8	.8	.4	.8	.7	.8	.6	.8	.8	.7
9	2.9	2.6	2.0	5.2	1.0	1.5	1.8	5.6	1.0	7.2
10	6.8	11.3	8.8	8.7	3.2	1.5	14.8	5.7	11.0	15.0
11	7.6	8.6	1.0	1.4	1.0	5.7	5.5	5.6	4.4	3.5
12	5.0	5.5	3.5	4.4	2.6	4.3	1.7	3.0	7.9	1.9
13	3.2	2.2	10.0	4.5	3.4	7.0	10.3	3.2	.8	1.2
14	8.2	2.2	2.3	2.1	1.7	2.0	1.9	2.5	3.7	3.9
15	7.6	.2	2.7	5.1	3.2	3.2	5.5	12.6	1.8	.2
16	14.2	4.0	15.0	8.3	3.8	2.8	12.8	11.2	4.6	15.0
17	2.2	2.3	15.1	10.7	3.2	3.2	5.2	2.2	11.1	9.1
18	4.0	7.1	1.4	8.0	2.2	2.5	3.3	1.7	1.3	6.7
19	10.7	10.3	6.8	1.6	9.0	10.0	12.3	5.7	3.2	-
20	3.2	-	6.0	8.8	7.3	4.5	3.5	7.2	4.2	-
21	-	-	7.2	10.8	3.7	2.0	2.7	7.7	1.8	-
22	-	-	5.1	-	2.3	2.0	1.4	3.1	2.5	-
23	-	-	-	-	1.4	4.0	1.6	4.2	10.7	-
24	-	-	-	-	1.2	3.5	3.0	1.7	1.0	-
25	-	-	-	-	2.2	1.5	-	1.7	3.1	-
26	-	-	-	-	3.8	1.5	-	4.8	1.7	-
27	-	-	-	-	12.3	15.0	-	15.0	6.9	-
28	-	-	-	-	5.7	1.2	-	-	-	-
29	-	-	-	-	8.0	8.6	-	-	-	-

TABLE 2 (Continued)

	Participant							
Question	F1	F2	G1	G2	H1	H2	I1	I2
1	.5	2.8	1.1	4.0	1.1	6.7	6.5	3.0
2	2.7	2.8	1.4	1.5	2.9	11.6	5.0	2.0
3	7.3	14.3	13.1	15.2	3.0	4.9	4.2	5.2
4	2.8	10.2	4.8	4.9	3.5	3.0	6.1	5.8
5	1.2	4.0	15.0	7.1	2.9	10.8	9.2	6.0
6	8.0	2.5	3.8	1.3	9.9	11.2	5.2	15.0
7	3.0	4.7	2.0	2.0	1.7	12.1	1.8	3.1
8	.8	.7	.5	.6	.8	.8	1.0	1.5
9	1.0	4.3	1.1	10.7	1.2	2.5	4.0	8.0
10	11.0	9.2	12.8	12.0	11.0	13.8	14.0	7.0
11	4.4	1.1	1.0	10.3	.9	1.3	1.0	10.0
12	7.9	2.3	2.1	2.2	1.9	5.7	4.0	2.0
13	.8	.8	1.0	4.5	.8	.8	8.8	5.8
14	3.7	1.8	2.0	4.5	6.5	1.5	1.4	8.7
15	1.8	.2	.8	1.0	.8	9.4	2.2	2.5
16	4.6	11.2	3.2	6.0	3.5	2.6	3.0	1.5
17	11.1	6.2	2.9	4.8	2.8	2.2	3.8	4.0
18	1.3	1.1	1.0	2.6	4.5	12.2	4.2	1.2
19	3.2	2.2	3.0	2.1	12.0	-	14.6	1.2
20	4.2	6.0	2.8	14.8	5.9	-	5.2	9.2
21	1.8	1.8	3.5	-	5.2	-	-	8.0
22	2.5	2.5	2.4	-	1.9	-	-	3.5
23	10.7	1.4	3.1	-	1.2	-	-	-
24	1.0	1.5	1.6	-	3.0	-	-	-
25	3.1	4.2	1.7	-	3.0	-	-	-
26	1.7	4.2	1.7	-	3.0	-	-	-
27	6.9	5.8	10.2	-	10.1	-	-	-
28	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-

TABLE 3

SUMMARY DATA ON QUESTIONS ANSWERED AND TIME TAKEN

	On Questions 1-17		In 100 Minutes	
Participant	Number Answered Correctly	Minutes Taken	Questions Attempted	Answered Correctly
A1	16	88.3	19	17
A2	13	90.0	18	14
B1	15	84.3	20	17
B2	15	92.7	18	15
C1	16	45.8	28	27
C2	16	66.2	26	23
D1	15	90.2	19	17
D2	16	77.6	21	20
E1	15	72.7	25	22
E2	14	114.5	16	13
F1	15	72.7	25	22
F2	17	80.2	25	24
G1	16	68.6	27	26
G2	16	89.0	19	18
H1	17	55.2	26	25
H2	16	101.0	17	16
I1	14	81.2	19	16
I2	11	91.2	19	13

TABLE 4

NUMBER OF ANSWERING SOURCES USED PER QUESTION BY PARTICIPANTS

	Participant									
Question	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
1	2	2	1	2	2	2	1	1	1	1
2	1	1	2	1	3	6	1	1	3	1
3	6	6	5	3	2	5	8	2	5	6
4	1	3	1	2	1	3	4	3	2	2
5	1	4	2	2	1	1	1	1	1	7
6	3	1	1	2	3	1	3	4	3	4
7	1	3	1	7	1	5	1	2	3	6
8	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	3	1	2
10	4	5	6	4	2	1	7	3	7	4
11	1	3	1	1	1	2	2	3	3	2
12	1	2	2	1	2	3	1	1	3	1
13	1	1	5	2	1	6	5	1	1	1
14	5	2	2	1	1	1	1	1	3	1
15	3	1	5	2	1	3	4	5	2	1
16	5	3	6	3	2	3	6	6	4	7
17	2	1	5	2	1	1	3	1	6	5
18	2	2	1	2	1	1	2	1	2	2
19	3	5	3	1	5	5	7	2	2	-
20	1	-	1	2	3	3	1	5	2	-
21	-	-	9	5	5	1	3	9	2	-
22	-	-	3	-	1	1	1	1	1	-
23	-	-	-	-	1	1	1	3	4	-
24	-	-	-	-	1	1	2	1	1	-
25	-	-	-	-	2	2	-	2	3	-
26	-	-	-	-	2	2	-	4	1	-
27	-	-	-	-	6	10	-	9	6	-
28	-	-	-	-	2	1	-	-	-	-
29	-	-	-	-	7	10	-	-	-	-

TABLE 4 (Continued)

	Participant							
Question	F1	F2	G1	G2	H1	H2	I1	I2
1	1	2	2	2	1	3	3	2
2	3	2	1	1	2	6	3	1
3	5	6	7	6	3	5	3	2
4	2	3	3	1	1	1	2	4
5	1	1	6	2	1	1	6	1
6	3	1	2	1	4	6	4	7
7	3	1	1	1	1	5	2	2
8	1	2	1	1	1	1	1	2
9	1	1	1	6	1	1	1	2
10	7	5	6	4	6	8	5	3
11	3	1	1	2	1	1	1	4
12	3	1	1	1	1	3	1	1
13	1	1	1	1	1	1	5	3
14	3	1	1	2	4	1	1	5
15	2	1	1	1	1	4	2	1
16	4	4	3	4	3	1	2	1
17	6	3	1	1	1	1	1	2
18	2	1	1	1	2	5	3	1
19	2	1	3	1	4	-	5	2
20	2	2	1	3	3	-	1	1
21	2	1	3	-	4	-	-	4
22	1	1	1	-	1	-	-	1
23	4	1	2	-	1	-	-	-
24	1	1	1	-	3	-	-	-
25	3	2	1	-	2	-	-	-
26	1	4	4	-	3	-	-	-
27	6	5	5	-	6	-	-	-
28	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-

TABLE 5

NUMBER OF SUBROUTINES REQUIRED PER QUESTION BY PARTICIPANTS

	Participant									
Question	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
1	2	2	1	2	2	2	1	1	1	1
2	1	1	2	1	1	2	1	1	2	1
3	2	4	4	2	1	2	3	3	5	5
4	1	2	1	1	1	1	1	1	1	2
5	2	5	5	2	2	2	1	2	1	8
6	1	1	1	1	2	1	1	3	1	1
7	1	3	1	4	1	2	1	1	1	4
8	1	1	1	1	1	1	1	1	1	1
9	2	2	2	2	1	1	2	3	1	3
10	2	2	3	3	3	1	6	2	7	3
11	1	2	1	2	1	1	1	1	1	2
12	3	3	1	2	2	3	1	2	5	2
13	1	1	2	4	1	3	1	1	1	1
14	2	1	2	1	1	1	1	1	2	1
15	2	1	2	1	1	2	1	1	1	1
16	3	2	3	2	1	1	3	4	4	2
17	1	1	3	3	1	1	1	1	3	2
18	1	2	2	2	1	1	1	1	1	2
19	1	3	1	1	3	4	4	2	1	-
20	1	-	2	2	2	2	2	2	1	-
21	-	-	5	3	1	1	2	4	2	-
22	-	-	2	-	1	1	1	1	1	-
23	-	-	-	-	1	1	1	3	3	-
24	-	-	-	-	2	1	1	2	1	-
25	-	-	-	-	2	1	-	1	2	-
26	-	-	-	-	1	1	-	2	1	-
27	-	-	-	-	2	6	-	3	4	-
28	-	-	-	-	1	1	-	-	-	-
29	-	-	-	-	4	4	-	-	-	-

TABLE 5 (Continued)

	Participants							
Question	F1	F2	G1	G2	H1	H2	I1	I2
1	1	2	2	2	1	2	1	1
2	2	2	1	1	2	2	1	1
3	5	2	4	5	3	2	2	2
4	1	2	2	1	1	1	2	1
5	1	2	7	2	1	2	4	3
6	1	1	1	1	3	2	3	5
7	1	1	1	1	1	2	1	1
8	1	1	1	1	1	1	1	2
9	1	2	1	5	1	1	2	2
10	7	4	7	4	6	5	3	3
11	1	1	1	1	1	1	1	1
12	5	2	1	2	2	3	1	1
13	1	1	1	2	1	1	3	2
14	2	1	1	2	3	1	1	3
15	1	1	1	1	1	2	1	1
16	4	2	2	5	3	1	2	2
17	3	2	1	1	1	1	1	1
18	1	1	1	1	2	3	1	1
19	1	1	1	1	2	-	4	2
20	1	1	1	1	2	-	1	2
21	2	1	3	-	2	-	-	2
22	1	1	1	-	1	-	-	1
23	3	1	1	-	1	-	-	-
24	1	1	2	-	3	-	-	-
25	2	1	1	-	1	-	-	-
26	1	2	2	-	1	-	-	-
27	4	1	2	-	2	-	-	-
28	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-

TABLE 6

NUMBER OF TIMES EACH PARTICIPANT USED EACH SUBROUTINE ON QUESTIONS 1-18

	Subroutines							
Participants	A	B	E	F	G	H	I	Total
A1	2	2	-	15	2	-	8	29
A2	4	2	2	13	4	-	11	36
B1	4	4	1	19	3	-	6	37
B2	7	2	3	11	5	-	8	36
C1	3	2	-	10	1	-	8	24
C2	2	2	-	11	3	-	10	28
D1	2	2	2	15	1	-	6	28
D2	3	3	3	13	3	-	5	30
E1	3	3	1	18	5	2	7	39
E2	6	3	2	11	5	-	15	42
F1	3	3	1	18	5	2	7	39
F2	5	4	-	12	4	-	5	30
G1	2	4	-	13	2	-	15	36
G2	5	2	1	17	2	-	11	38
H1	3	2	-	16	4	3	5	33
H2	1	3	-	15	2	3	9	33
I1	2	3	-	13	2	1	10	31
I2	2	4	-	9	4	2	12	33
Total Trained	24	25	5	137	25	8	72	296
Percent of Total	8.1	8.4	1.7	46.3	8.4	2.7	24.3	
Total Untrained	35	25	11	112	32	5	86	306
Percent of Total	11.4	8.2	3.6	36.6	10.4	1.6	28.1	

APPENDIX B

COVER LETTER FOR REFERENCE QUESTION RATING FORMS

REFERENCE QUESTION RATING FORM A

REFERENCE QUESTION RATING FORM B

LIBRARY RESEARCH CENTER
428 Library

UNIVERSITY OF ILLINOIS
Urbana, Illinois

COVER LETTER FOR REFERENCE QUESTION RATING FORMS

July 20, 1966

A few weeks ago you were kind enough to cooperate with a research project I am undertaking by supplying some information for me. Thank you very much; the information has been useful. Now, may I ask you to be of service to the study again?

I am attempting to construct a set of "fact" type reference questions typical of those asked in medium-sized public libraries in the Midwest. Would you have one of your senior reference staff members take each set of questions enclosed and rate each question as to its relative difficulty? I realize that it is very hard to judge how difficult it would be to answer a reference question without actually attempting to answer it and that there is probably no such thing as a typical reference question. However, I think I will be able to have more confidence in my set of questions if I can get the judgment of practicing reference librarians on the potential questions.

May I suggest that the librarians consider these questions in comparison with the numerous questions for specific facts that they answer day after day (leaving out of consideration the often more difficult and complicated questions calling for interpretation or judgment)? Then, on the basis of such factors at the probable time required to produce an answer, detailed knowledge of sources required, and probability of success in answering, they can rate each question as average or typical among the factual questions asked your reference department, easier or simpler than average, or more difficult or complex than typical. Verbal comments concerning individual questions or the set as a whole are welcome and can be written on the back of the rating form or on a separate sheet.

I would appreciate very much your returning the completed rating forms as soon as convenient in the stamped self-addressed envelope. Return by August 15 would be particularly helpful.

Sincerely,

Charles A. Bunge
Research Associate

CAB/sp
enclosure

LIBRARY RESEARCH CENTER
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UNIVERSITY OF ILLINOIS
Urbana, Illinois

REFERENCE QUESTION RATING FORM A

	Easier	Average	Harder
1. At what age does a boy cease to be called "master"?			
2. Medical symbol for male and female.			
3. Is American Indian Day a National Holiday?			
4. Number of weeks it takes for different common vegetables to produce ripe produce.			
5. How is the date of Easter determined? On what dates will Easter fall from 1967 to 1970?			
6. I want a list of wholesalers of tropical fish in Miami, Florida.			
7. How long do you have to wait in Kansas after a divorce before a second marriage?			
8. What is the weight of sand per cu. ft. or cu. yd.?			
9. What are the top ten high schools in the U.S., according to the number of National Merit Scholarship finalists?			
10. Was there a real Indian who modeled for the U.S. nickel? If so, what is or was his name?			
11. Is the life expectancy in the U.S. different for whiles and non-whites? How is this computed?			
12. On which concerto was "Tonight We Love" based?			
13. How do I get the address of an American Soldier who is serving in Viet Nam?			

	Easier	Average	Harder
14. How does one play Red Dog?	______	______	______
15. What is the pension for ex-presidents of the U.S. and widows thereof?	______	______	______
16. What kind of fishing license does an out-of-state tourist need for a week in Missouri? How much does it cost?	______	______	______
17. Is it legal to photograph money for advertising?	______	______	______
18. What is the height of the basket in basketball for high school?	______	______	______
19. What is the average salary of a stock broker?	______	______	______
20. Where can I locate a map of the travels of Ulysses?	______	______	______
21. What was the nature of the change made in the Cost of Living Index in January, 1964?	______	______	______
22. What was the source of the phrase "Voice of the Turtle"?	______	______	______
23. Where can I find the names and addresses of all U.S. and state senators and congressmen currently representing this locality?	______	______	______
24. What is the location of Lake Taal?	______	______	______
25. Whom does one contract to buy land from the U.S. Government?	______	______	______
26. I need a copy of the building code for this city and state.	______	______	______
27. How high are the tides around Inchon, Korea?	______	______	______
28. Where can I find a list of 20 homonyms?	______	______	______
29. Where is a list of nations newly independent since 1957?	______	______	______

		Easier	**Average**	**Harder**
30.	What is the comparison of the value of the dollar for 1916 and 1960?			
31.	Definition of "Taliesin" (F. L. Wright's home)?			
32.	What or who is the source of the "debate" about how many angels can stand on the point of a needle?			
33.	What was the name of Hopalong Cassidy's horse?			
34.	What now stands where Solomon's Temple once stood?			
35.	Whom did Henry VIII's last wife marry after Henry's death? Was there a child of the marriage? A boy or a girl?			
36.	What are the percentages of Roman Catholics and Protestants in West Germany?			
37.	What is the gestation period of the rat?			
38.	What is the time differential between Viet Nam and New York?			
39.	What are the different hands for on a barometer? How do I set them for this locality?			
40.	A list of publishers of Catholic religious educational print and non-print materials.			

LIBRARY RESEARCH CENTER
428 Library

UNIVERSITY OF ILLINOIS
Urbana, Illinois

REFERENCE QUESTION RATING FORM B

	Easier	**Average**	**Harder**
1. Where can I find a list of publishers of true romance magazines?			
2. What are the colors of the church altar cloths for the different seasons?			
3. What is the cost per capita of the U.S. space program?			
4. What are the five U.S. states with the largest population, in order of size?			
5. Where can I find the letter of Martin Luther King written in the Birmingham Jail?			
6. Where are current editions of the U.S. and state constitutions?			
7. How much more expensive is it for a family to live in Chicago than in Atlanta?			
8. What is the present membership in U.S. churches and what are recent trends in church attendance?			
9. What are the state and local laws regarding passing on the left when driving a motor vehicle?			
10. What were the prices of bread and butter in the 1920's?			
11. Who is the present head of the Congo government?			
12. Which cities in the U.S. have the largest police forces?			
13. Can a four-family apartment house legally be built in the (X) area of this town? (X being one or another section)			

		Easier	Average	Harder
14.	I am a male. Where can I complete a course in practical nursing?	______	______	______
15.	What is one acre equal to in the metric system?	______	______	______
16.	What is meant by the "battered child syndrome"?	______	______	______
17.	Are the holidays of July 4th and May 30th national holidays, that is, do all states observe them?	______	______	______
18.	Where can I find the name and address of the company that made a high chair with the brand "Comfort Lines"?	______	______	______
19.	How do you word wedding invitations when the bride's parents are divorced and the mother has remarried?	______	______	______
20.	What is the annual rainfall for the principal cities of the world?	______	______	______
21.	What part of the castor bean plant is poisonous and what would be the first aid for such poisoning?	______	______	______
22.	What is the life span of the Red Squirrel?	______	______	______
23.	Where is a list of the leading U.S. gold and silver mines?	______	______	______
24.	What is the recommended gap for points on a 1962 Falcon?	______	______	______
25.	What are cultured pearls?	______	______	______
26.	How much raw materials will be needed for a concrete project of 3" x 100 sq. ft.? How much would this much concrete weigh?	______	______	______
27.	What was the size of the old one dollar bills of before 1929?	______	______	______

	Easier	Average	Harder
28. Who is credited with founding the "Impressionistic" school of music?	____	____	____
29. What are the dimensions of a baseball diamond for Little League play?	____	____	____
30. What are the locations of camping trailer parks in Wyoming?	____	____	____
31. Where can I locate some examples of Haikai or Haiku?	____	____	____
32. What is the milage from Chicago to Hongkong?	____	____	____
33. Where is a biography of Admiral Kidd of World War II?	____	____	____
34. When did Hoffa affear before the Congressional Committee hearings conducted by Senator McClellan?	____	____	____
35. How many soldiers were in a regiment during the Civil War?	____	____	____
36. Was Wildflecken in the American zone of occupation?	____	____	____
37. How high above sea level is Cleveland?	____	____	____
38. What is the difference between term insurance, ordinary life, and endowment insurance?	____	____	____
39. What would be the amount of interest paid on $50,000 for 20 years at 5 1/2 percent?	____	____	____
40. Has the average height and weight of Americans increased since the turn of the century?	____	____	____

APPENDIX C

TEST QUESTIONS AS ASKED, WITH "BEST" ANSWERS*

1. I would like the names and office addresses of the Senators and Representatives representing me in the State Legislature. I live in the downtown area of this city. Now I want the same thing for the Federal Legislature.
   (Varied from library to library)

2. I head somewhere that California passed New York in population, to become the most populous state, since the 1960 census. Could you find me the population of California and New York later than 1960 to verify this?
   (1965 estimate: New York, 18,075,000; California, 18,605,000)

3. For a nature project that I'm involved with, I need to know the average life span of the Red Squirrel.
   (Average or normal, 6 or 7 years; potential, 10 years)

4. For a speech that I am preparing I need to know the total cost of the U.S. space program for a recent year. Then I want to convert it into a per capita figure.
   (1965: Approximate expense, $6,886,000,000; estimated population, 193,818,000 = $35.52 per capita)

5. Recently a subject mentioned as a possible discussion topic at my club was the "battered child syndrome." This term is new to me. Could you find just enough information on this so that I could know to what it refers?
   (The group of symptoms which indicates to a doctor that a child has been beaten or mistreated)

6. For a Sunday School lesson I am preparing I need to know what now stands on the spot where Solomon's Temple once stood.
   (Islamic sacred edifice, the Dome of the Rock)

7. How many soldiers would have been in a typical or average regiment in the Civil War?
   (Union side: Authorized at 845-1050 men; were actually usually much smaller)

8. On what dates will Easter Sunday fall in 1967 and 1968?
   (1967: March 26; 1968: April 14)

9. Can you find me some examples of Haikai or Haiku?
   (Form of Japanese poetry; can be found in various places)

10. What was the name of Hopalong Cassidy's horse?
   (Topper)

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* Sources for answers are not given because most questions were answered from various sources.

APPENDIX C (continued)

11. I have a baby bed which needs to have the teething rail replaced. All I can find on it is the name "Childcraft." Can you find me an address for the company who made this?
(Smith Cabinet Manufacturing Company, Salem, Indiana)

12. Can you find me a copy of the letter Martin Luther King wrote in the Birmingham Jail? I think it has become sort of a Civil Rights classic.
(Can be found in magazines, civil rights anthologies, biographies of King)

13. When, that is, at what age should a boy cease to be called "master"?
(10 or 12 years old)

14. A neighbor has Castor Beans in his garden. Is a part of the Castor Bean plant poisonous? If so, what part?
(All parts of the plant are poisonous, seeds are deadly to children)

15. If one had a child who did get poisoned from a Castor Bean, what should be done--what might be the best first aid?
(Call the doctor; call the poison control center; induce vomiting)

16. I have been given a barometer. It is one of the round-faced kind with two needles. What are these needles for? How do I make the initial setting for this area?
(Black needle is indicator; gold needle is reference hand; call radio station or weather bureau for initial setting)

17. I am wanting to build a patio. It is to consist of a concrete slab of 6 inches by 100 square feet. How much raw materials will I need for such a project?
(12.5 sacks cement, 25 cubic feet sand, 37.5 cubic feet gravel, 69 gallon water)

18. How much more or less expensive is it for an average family to live in Chicago than it is in Atlanta?
(1963: Chicago, 102.0; Atlanta, 93.9; based on Washington, D.C.=100)

19. I am shopping for a used air conditioner. Some have their size ratings giving in B.T.U.'s and some in Tons. What is the relationship between these two ratings?
(1 Ton = approximately 12,000 B.T.U.)

20. When did Jimmy Hoffa first appear and testify before the Congressional committee hearing conducted by Senator McClellan?
(August, 1957)

21. Somewhere in my reading I have run across the name of an Admiral Kidd. I'd like just enough biographical information to know why he would have been written about. As I remember he made his name in the World War II era of the late 1930"s or early 1940"s.
(Rear Admiral of U.S. Fleet, killed during Japanese attack on Pearl Harbor, 1941)

22. What is the recommended gap for points on a 1962 Ford Falcoln six-cylinder sedan?
(.025)

APPENDIX C (continued)

23. Around 2-1/2 or three years ago there was a change in the way of cost of living index is computed. What, basically, did this change consist of?
(Up-dated sample of cities, stores, etc.; modernized list of goods and services; revised weights to reflect modern spending patterns)

24. What percentage of the population of West Germany is Roman Catholic and what percentage is Protestant?
(1961: 51% Protestant; 44.1% Roman Catholic)

25. I am going on vacation in Missouri for a week. What kind of fishing license do I need for a short time and how much does it cost?
(14 day tourist license costs $3.25; also need $2.25 trout permit)

26. I am thinking about raising some vegetables. How long does it take for various common vegetables to produce ripe produce?
(Answer varied according to vegetables chosen)

27. Was Wildflecken in the American zone of occupation?
(Yes)

28. Whom should I contact if I wish to investigate buying land from the U. S. Government?
(Bureau of Land Management, Washington, D. C., or Regional Land Offices)

29. Can you find me a map showing the travels of Ulysses?
(Can be found in atlas of classical world)

APPENDIX D

OBSERVATION SCHEDULE/INTERVIEW GUIDE

Library Research Center, University of Illinois

Reference Study

Observation Schedule

Question No.: ________ Librarian: ____________________________

Step No.	1	2	3	4	5	6	7	8	9	10+
Activity										
USED REFERENCE TOOL:										
As Ans. Source										
Found Answer?										
As Guide to Source										
Periodical Index										
Other Index										
Bib. or Gd. to Lit.										
Other										
Found Lead?										
As Source of Def.										
USED CARD CATALOG:										
Under Subject										
Under Type of Work										
Under Specific Work										
Found Lead?										
USED NON-REFERENCE WORK:										
Went Directly to										
Via Card Catalog										
Found Answer?										
USED PERIODICAL:										
Went Directly to										
Via Index										
Found Answer?										
CONSULTED PATRON:										
Make Ques. More Specif.										
Specify General Subject										
Define Term(s)										
Specify Kind of Info.										
Suitability of Answer										

Correct Answer Found? Yes: ___ No: ___ Time: ________

No. of Sources Consulted: ______ Ans. Source: ____________________

(If not ans.) Is ans. source in collection? Yes: ___ No: ___

Notes on Steps:

LIBRARY RESEARCH CENTER, UNIVERSITY OF ILLINOIS

Reference Study

Guide to Interview Concerning Answering Process

Question No.: __________ Librarian: ________________________________

1. Can you describe briefly what sort of thoughts and decisions started through mind as you decided how to attack this question?

2. Were there any particular parts or words of the question that you considered especially important, as you thought about how you would locate the answer? If so, what were they?

3. When you first turned to begin looking for the answer would you say that you were mainly thinking of a certain kind of book or tool, for example, an alamanac; a general or specific subject, such as science or astronomy; or a specific tool, by title, location, etc.; or do any of these choices cover your intentions? (If a choice is made, ascertain which type, subject, work, etc.)

shelves __________
4. When we started for the catalog ________ did you have a specific source
other (specify) ______________________________
in mind to try, or did you hope to find a likely source listed or shelved in the appropriate subject section? (Ask this for each appropriate step. If answered "specific source," ascertain which.)

5. Can you tell my why the sources you first thought about might have come to mind? (If needed for explanation: For example, have you answered similar questions from these works in the past?)

6. Can you tell me what might have caused you to choose to try the specific source you first used as a possible answering source?

7. Do you remember studying any or all of the sources you consulted to answer this question in any of the institutes, courses or other training you have had.

APPENDIX E

INSTRUCTIONS TO PARTICIPATING STAFF MEMBERS

As you have probably been told, I am with the Library Research Center of the Graduate School of Library Science at the University of Illinois. I am conducting a study into just how practicing public library reference staff members go about finding the answers to questions asked by patrons. As one method of doing this, I am going to ask you a set of reference questions and watch closely as you go about finding the answers to them. Some of the questions are fairly simple, and others are more difficult; some may not even be answerable at this library, since I have not checked the questions against the collection. I would like you to treat me and my questions exactly as you would a patron from off the street. Ask me questions when and if you would a patron, tell me you can't find the information if that is what you would tell a patron, suggest trying another library or borrowing a book on interlibrary loan, and so forth. Work as though you are on duty alone and cannot ask another librarian for help. Also, work as though I am a patron whom you would not expect to use the card catalog and books alone. I shall be following you around making notes. Please do not allow this to make you uncomfortable. This is not done in an effort to judge you, but to keep me from forgetting what I have observed, since I want to be able to report what actually happens in public library reference work. Please work as rapidly as you would if your patron were waiting on the telephone

APPENDIX E (continued)

or were evidently in somewhat of a hurry, but not so quickly as to do less thorough work than you usually do. There is no specific number of questions that we must finish, but I do want to know how long it takes a person with your experience to answer such questions. Are there any questions?